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Volume II

F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM
Volume II - Appendices A through K

AERONAUTICAL & MARINE SYSTEMS ~~SECTOR~~
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The objective of the F100 multivariable controls program was to demonstrate modern control design methodology applied to a state-of-the-art aircraft turbine over its entire flight envelope. Linear quadratic regulator design methods were used to develop feedback gains for a series of operating points. Reference schedules were used to translate pilot and ambient inputs to reference point specifications. A transient controller produced smooth and rapid transitions from one operating point to another. A variable

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20. structure integral trim system produced specified steady-state performance and limit accommodation in the presence of simulated degradation effects and instrument errors.

The resulting control logic was extensively tested on a hybrid simulation of the F100 turbofan and will be used to control an engine in an altitude test cell. The details of the design procedure, linear model analysis and a summary of digital and hybrid simulation tests results are presented in this report.

FOREWORD

This final report was submitted by Systems Control, Inc. (Vt), Palo Alto CA under Air Force Contract F33615-75-C-2053. The effort was sponsored by the National Aeronautics and Space Administration, Lewis Research Center, Cleveland OH, and the Air Force Aero-Propulsion Laboratory, Air Force Systems Command, Wright-Patterson Air Force Base OH under Project 3066, Task 306603 and Work Unit 30660370 with Charles A. Skira, AFAPL/TBC, as Project Engineer. This program was initiated with FY 75 Aero-Propulsion Laboratory Director's Funds. Dr. W. Earl Hall, Jr. of Systems Control, Inc. (Vt) was Project Manager for this effort. Project Engineer was Dr. Ronald L. De Hoff. Ms. Deborah Buenz responsible for the technical publication of this report.

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The Air Force would especially like to acknowledge Lt Col Walter J. Rabe formerly of the Air Force Office of Scientific Research who contributed greatly to the formulation of this research effort.

This report consists of two volumes:

Volume I - Development of F100 Control System

Volume II - Appendices A through K

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APPENDIX A

EIGENSYSTEM SENSITIVITY MINIMIZATION AND CALCULATION

A.1 EIGENVALUE DERIVATIVES

Consider an nxn matrix A with n distinct eigenvalues $\lambda_1, \lambda_2, \ldots, \lambda_n$. Let the diagonal matrix Λ be given as

$$\Lambda = \begin{bmatrix} \lambda_1 & & & 0 \\ & \lambda_2 & & \\ & & \ddots & \\ 0 & & & \lambda_n \end{bmatrix} \tag{A.1}$$

Let the i<u>th</u> column of the matrix U, u_i be the right eigenvector corresponding to the eigenvalue λ_i. Then

$$AU = U\Lambda \tag{A.2}$$

Let the i<u>th</u> column of the matrix V, v_i be the left eigenvector corresponding to the eigenvalue λ_i. Then

$$V^H A = \Lambda V^H \tag{A.3}$$

or

$$A^H V = V\Lambda^H = V\bar{\Lambda} \tag{A.4}$$

where the "H" superscript indicates the Hermitian transpose, or the complex conjugate of the ordinary transpose.

When A is not symmetric, the right eigenvectors u_i are not mutually orthogonal. However, the right and left eigensystems have a property called biorthogonality. A right eigenvector u_i and a left eigenvector v_j corresponding to distinct eigenvalues λ_i and λ_j are orthogonal.

<u>Proof</u> [52]

By definition

$$Au_i = \lambda_i u_i \quad ; \quad A^H v_j = \bar{\lambda}_j v_j \tag{A.5}$$

Form the two inner products:

$$v_j A u_i = \lambda_i v_j u_i \quad ; \quad u_i A^H v_j = \bar{\lambda}_j u_i v_j \tag{A.6}$$

The second relation gives

$$v_j A u_i = \lambda_j v_j x_i \tag{A.7}$$

Subtracting this from the first inner product gives

$$(\lambda_i - \lambda_j)\; v_j u_i = 0 \tag{A.8}$$

If $\lambda_i \neq \lambda_j$, then v_j and u_i are orthogonal.

We can now show that the inverse of the matrix U is a matrix of left eigenvectors of A:

$$(U^{-1})^H A = \Lambda (U^{-1})^H \tag{A.9}$$

<u>Proof</u> [52]

Define V such that $V^H = P^{-1}$. By definition of U

$$AU = U\Lambda \tag{A.10}$$

Since $V^H U = UV^H = I$, we have

$$V^H A U = \Lambda \tag{A.11}$$

$$V^H A = \Lambda V^H \tag{A.12}$$

Equation (A.12) is the same as Eq. (A.3).

Now we can consider eigenvalue and eigenvector derivatives. Differentiating Eq. (A.2) by some parameter θ gives

$$A_\theta U + AU_\theta = U_\theta \Lambda + U\Lambda_\theta \tag{A.13}$$

Multiply through by $U^{-1} = V^H$

$$V^H A_\theta U + \Lambda V^H U_\theta = V^H U_\theta \Lambda + \Lambda_\theta \tag{A.14}$$

The i,j elements of Eq. (A.14) can be written as

$$[V^H A_\theta U]_{ij} + [V^H U_\theta]_{ij}\, \lambda_i = [V^H U_\theta]_{ij}\, \lambda_i + [\Lambda_\theta]_{ij} \tag{A.15}$$

For $i=j$ we have

$$[V^H A_\theta U]_{ii} = \frac{\partial}{\partial\theta} \lambda_i \tag{A.16}$$

or

$$[U^{-1} A_\theta U]_{ii} = \frac{\partial}{\partial\theta} \lambda_i \tag{A.17}$$

A.1.1 Computation Using Real Arithmetic

If the matrix A is not symmetric, then its eigenvalues and eigenvectors will be complex. During numerical computations, the use of complex arithmetic should be avoided; it is time-consuming and installation dependent. Complex arithmetic can

be avoided by using a block diagonalizing transformation U_b rather than the diagonalizing transformation $\bar{U}$ [54]. The complex block diagonal matrix

$$\mathscr{K} = \mathrm{diag}\left\{\frac{1}{2}\begin{bmatrix} 1 & -j \\ 1 & j \end{bmatrix}, \ldots, \frac{1}{2}\begin{bmatrix} 1 & -j \\ 1 & j \end{bmatrix}\right\} \tag{A.18}$$

transforms Λ to a block diagonal real matrix

$$\begin{aligned} B &= \mathscr{K}^{-1}\Lambda\mathscr{K} = \mathscr{K}^{-1}U^{-1}A\mathscr{K} \\ &= \mathrm{diag}\left\{\begin{bmatrix} \sigma_1 & \omega_1 \\ -\omega_1 & \sigma_1 \end{bmatrix}, \ldots, \begin{bmatrix} \sigma_n & \omega_n \\ -\omega_n & \sigma_n \end{bmatrix}\right\} \end{aligned} \tag{A.19}$$

The matrix $U\mathscr{K}$ is also real. If U is given as

$$U = [(p_1+q_1 j) \vdots (p_1-q_1 j) \vdots \cdots \vdots (p_n+q_n j) \vdots (p_n-q_n j)] \tag{A.20}$$

then $U_b = U$ is

$$U_b = [p_1 \vdots q_1 \vdots \cdots \vdots p_n \vdots q_n] \tag{A.21}$$

The eigenvalues are then given in terms of U_b as

$$[\mathscr{K}\mathscr{K}^{-1} U^{-1} A_\theta U \mathscr{K}\mathscr{K}^{-1}]_{ii} = \frac{\partial}{\partial\theta}\lambda_i \tag{A.22}$$

$$[\mathscr{K} U_b^{-1} A_\theta U_b \mathscr{K}^{-1}]_{ii} = \frac{\partial}{\partial\theta}\lambda_i \tag{A.23}$$

If the complex matrix $\mathscr{K}$ is represented as

$$\mathscr{K} = \mathscr{K}_r + \mathscr{K}_i j \tag{A.24}$$

and $\mathscr{K}^{-1}$ is represented as

$$\mathscr{K}^{-1} = (\mathscr{K}^{-1})_r + j(\mathscr{K}^{-1})_i \tag{A.25}$$

then the real and imaginary parts of the eigenvalue derivatives can be evaluated using real arithmetic as

$$\begin{aligned}\frac{\partial}{\partial\theta}\lambda_i = {} & [(\mathscr{K})_r\, U_b^{-1}\, A_\theta U_b (\mathscr{K}^{-1})_r]_{ii} \\ & - [(\mathscr{K})_i\, U_b^{-1} A_\theta U_b\, (\mathscr{K}^{-1})_i]_{ii} \\ & + j\,[(\mathscr{K})_i U_b^{-1} A_\theta U_b (\mathscr{K}^{-1})_r + (\mathscr{K})_r U_b^{-1} A_\theta U_b (\mathscr{K}^{-1})_i]_{ii}\end{aligned} \tag{A.26}$$

A.1.2 Differentiation of the Euler-Lagrange Equation Matrix

An analytic formula for the derivative of the Euler-Lagrange equation matrix with respect to elements of its constituent matrix is quite complex due to the presence of several matrix triple products such as $H^T A\, H$ and $GB^{-1}G^T$. For this reason, the derivative of the Euler-Lagrange matrix is formed by a difference approximation to the derivative. The centered difference approximation to the first derivative is used.

$$f'(x) \approx \frac{f(x+h) - f(x-h)}{2h}$$

The resulting approximation is exact when used to evaluate the derivative of the Euler-Lagrange matrix with respect to any of

its constituent matrices. The one exception is elements of the B matrix.

A.2 LQR SENSITIVITY MINIMIZATION [56]

A.2.1 Problem Statement

Consider the system

$$\dot{x} = Fx + Gu + \Gamma w$$
$$y = Hx + v \quad , \tag{A.27}$$

where the matrices F, G, Γ, and H contain parameters the values of which are uncertain. If these parameters are considered as Gaussian random variables, a Gaussian random vector may be formed of which they are the components. This vector is specified

$$E(z) = z_n \quad , \tag{A.28}$$

where the components of z_n are the nominal values of the parameters, and by

$$E[(z - z_n)(z - z_n)^T] \tag{A.29}$$

is a covariance matrix which is assumed known. Equation (A.27) may then be written as

$$\dot{x} = F(z)x + G(z)u + \Gamma(z)w \tag{A.30}$$

$$y = H(z)x + v \quad ,$$

$$x(0) = 0.$$

The control is defined as

$$u = -Cx \tag{A.31}$$

where the values of C may be left free or defined by functional relationships to other parameters of the system. For this definition of u to be valid, Eq. (A.27) generally is required to describe and augmented system that includes the plant and the compensations. The matrices F, G, H, and Γ then have to be defined accordingly. A quadratic PI for this system is

$$J = \lim_{t_f \to \infty} \frac{1}{t_f} \int_0^{t_f} E(x^T A x + u^T B u)\, dt \quad . \tag{A.32}$$

In this expression, the expected value is taken over the probability distributions of x and u that are derived from both the distributions of the random process w and of the random vector z. Note that w is the process noise of the augmented system. Since w and z are independent, the expected value of a function of x and u is

$$E[f(x,u)] = \int_{x,u} f[x(w,z),\ u(w,z)]\ p[x(w,z),\ u(w,z)]dxdu$$

$$= \int_w E_z p(w)dw \cdot \int_z E_w p(z)dz \quad , \tag{A.33}$$

where

$$E_z = \int_z g(w,z)\ p(z)dz$$

is the expected value over the distribution of z and

$$E_w = \int_w g(w,z)\ p(w)dw$$

is the expected value over the distribution of w.

A free parameter vector θ is defined by the designer. This vector consists of q parameters of the system matrices that can be varied by the designer.

The problem is now stated as follows. Given the system of Eqs. (A.30) and (A.31) in which the system matrices are functions of a variable parameter vector defined by Eqs. (A.28) and (A.29) determine the value of the free parameter vector θ so that the PI of Eq. (A.32) is minimized.

A.2.2 Derivation of Equations [56]

The cost index Eq. (A.32) may be transformed to the form

$$\begin{aligned} J &= \mathrm{tr}\ (A + C^T BC) \lim_{t_f \to \infty} \frac{1}{t_f} \int_0^{t_f} [X_n(t) + \delta X(t)]dt \\ &= \mathrm{tr}[(A + C^T BC)(\overline{X}_n + \overline{\delta X})] \end{aligned} \tag{A.34}$$

where $\overline{X}_n$ and $\overline{\delta X}$ are the time averages over all time of X_n and δX, respectively, and X_n is the nominal state covariance matrix and δX is the addition covariance due to parameter uncertainties.

For a stable system, X_n and δX tend to constant values $X_n(\infty)$ and $\delta X(\infty)$. Since the averaging in Eq. (A.34) is per-

formed over a large time interval, it can be assumed that $\overline{X}_n \to X_n(\infty)$ and $\overline{\delta X} \to \delta X(\infty)$. The PI therefore becomes

$$J = \mathrm{tr}\ [A + C^T BC][X_n(\infty) + \delta X(\infty)] \qquad (A.35)$$

$$= J_o + J_A \quad ,$$

where

$$J_o = \mathrm{tr}[(A + C^T BC)X_n(\infty)]$$

is the nominal PI, and

$$J_A = \mathrm{tr}[(A + C^T BC)\delta X(\infty)]$$

is the additional PI due to the parameter variations. The PI of Eq. (A.35) can be minimized computationally by a two-step sequence: (a) the matrices $X_n(\infty)$ and $\delta X(\infty)$ are found for a given value of the free parameter vector, θ; the PI that corresponds to this value is then determined; and (b) the θ vector is modified in a direction that decreases J. This sequence is repeated until the decrease in J in one cycle is less than a predetermined value.

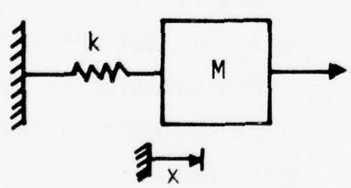
The two parts of this sequence are independent and computer programs for each one can be developed separately.

APPENDIX B

INTEGRAL CONTROL WITH FEEDFORWARDS - AN EXAMPLE

B.1 STEADY-STATE SCHEDULING

The philosophy of steady-state or reference point design can be illustrated with a simple linear example. Many problems with reference point selection in nonlinear, real systems are caused by the nonhomogeneity of the governing equations, rather than the nonlinearity, so a nonhomogeneous linear equation will show the important effects in an analytically tractable form. Consider Figure B.1:



$$m\ddot{x} = f - kx$$
$$y = x$$

Let $m = k = 1$

$$\boxed{\ddot{x} + x = 2u}$$

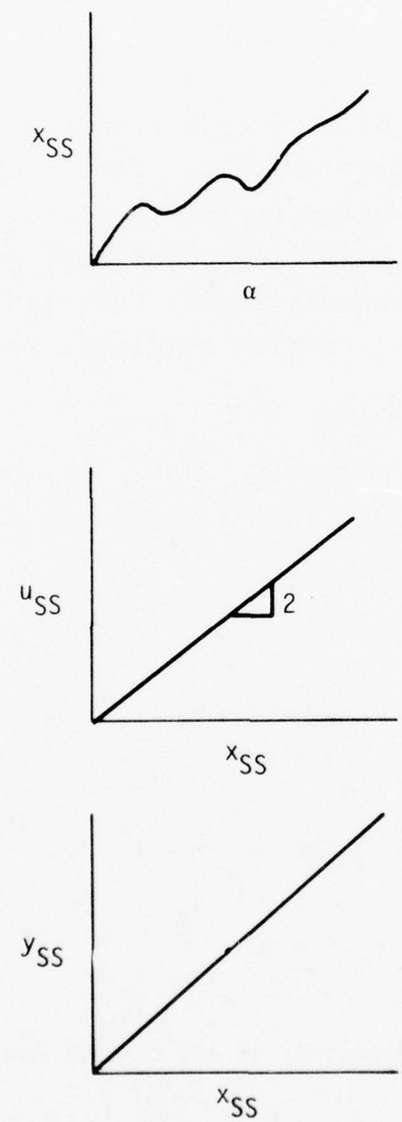
$$f = gu$$
$$g = 2$$

Equilibria: $x_{SS} = 2u_{SS}$ (independent of any control law)

Figure B.1 Example System

Steady-State Schedules

There is a schedule to indicate how the output is to be programmed as a function of input quantities from the operator or the environment; this is shown in Figure B.2:



α is an input specified by "pilot" or environment. By definition, there is some desired output from the system as a function of α.

These three graphs show schematically the desired reference point of the system.

Each of the states and controls is really a function of only α but this graphical representation is more convenient and computationally more efficient.

Figure B.2 Convenient Reference Schedules

An alternative is to represent each of the states and controls as a function of α explicitly, for example, in Figure B.3:

Figure B.3 Alternative Schedules

But this would be much less computationally efficient. In complex systems, convenient, efficient and accurate reference point determination is a major design goal which can be achieved only through a physically meaningful approach and accurate system data.

Returning to the example, a control system can be designed so that the output reaches a desired set point in a well behaved way. Consider the classical design using position and rate feedback (both assumed measured):

$$u = u_d + C_x(x - x_d) + C_v(v - v_d) \tag{B.1}$$

Let

$$C_x = -\frac{1}{2}; C_v = -1 \quad ; \quad v = \dot{x} \quad ; \quad v_d \equiv 0 \tag{B.2}$$

Substituting into system equation:

$$\ddot{x} + 2\dot{x} + 2x - (x_d) = 2(u_d) \quad . \tag{B.3}$$

If the reference point is an equilibrium,

$$x_d = 2u_d \tag{B.4}$$

$$\ddot{x} + 2\dot{x} + 2x = 4u_d \tag{B.5}$$

and in steady-state,

$$x = 2u_d = x_d \tag{B.6}$$

The transient response to reference point changes and disturbances is well behaved in a classical sense ($\zeta = 0.707$). The behavior would be different if the actuator effectiveness, g, was specified incorrectly; the equations in terms of g explicitly are:

$$x + gx + (1 + \frac{g}{2})x - \frac{g}{2} x_d = g\, u_d \tag{B.7}$$

Let $g = 2 + \varepsilon$

$$\ddot{x} + (2+\varepsilon)\dot{x} + (2 + \frac{\varepsilon}{2})x - (1 + \frac{\varepsilon}{2})x_d = (2+\varepsilon)u_d \tag{B.8}$$

The schedule was based on the incorrect g so that

$$\begin{aligned} x_d &= 2\, u_d \\ \ddot{x} + (2+\varepsilon)\dot{x} + (2 + \frac{\varepsilon}{2})x &= 2(2+\varepsilon)u_d \end{aligned} \tag{B.9}$$

and at equilibrium:

$$x_{SS} = \frac{4(2+\varepsilon)}{4+\varepsilon}\, u_d \tag{B.10}$$

and the steady-state "hang-off" is

$$\Delta x = x_{SS} - x_d = \frac{2\varepsilon}{4+\varepsilon} u_d \tag{B.11}$$

$$\Delta u = u_{SS} - u_d = \frac{-\varepsilon}{4+\varepsilon} u_d \tag{B.12}$$

The transient response is also degraded but conservative control design should make this effect unimportant. It is possible that the steady-state offset could cause significant problems for high performance systems requiring accurate tracking.

It can be shown that nonlinearities produce effects analogous to modeling errors so it is not possible to specify a reference point for a physical system without some inaccuracy. However, since physical laws can be applied to reference point schedules, a good design technique can reduce the error associated with the approximation.

B.2 INTEGRAL CONTROL FOR REFERENCE POINT TRIM AND LIMITS

Suppose the control law in the previous example is modified. Let

$$u = u_d - \frac{1}{2}(x - x_d) - v - C_I b \tag{B.13}$$

$$\dot{b} = x - x_d \tag{B.14}$$

Differentiating u and replacing in the system equation yields

$$\dddot{x} + 2\ddot{x} + 2\dot{x} + 2C_I(x - x_d) = 0 \tag{B.15}$$

At equilibrium,

$$x = x_d \tag{B.16}$$

regardless of parameter variations and

$$u_{SS} = \frac{1}{g} x_d \tag{B.17}$$

$$\Delta u = \left(\frac{1}{g} - \frac{1}{2}\right) x_d \tag{B.18}$$

If C_I is chosen so that the system is stable and the variation in g is not so large as to cause instability, then the state, x, will achieve its desired value independent of any system parameters. However, there still will be a hang-off in u.

Many problems arise with this implementation. Most are due to the fact that transient behavior is degraded by the addition of a slow closed-loop root. Feedforward of the reference point is used in practical systems to achieve reasonable transient performance. Also, by raising the order by one, the parameter sensitivity has been increased. The stability region for variations in g and C_I is shown in Figure B.4.

The control law specified in Eq. (B.13) includes a control reference feedforward. However, it was shown that x achieves its desired value without any knowledge of the equilibrium u. Why should this feedforward be included? Consider the Laplace transform of the system with integral control:

$$\left(s^2 + gs + 1 + \frac{g}{2} + \frac{gC_I}{s}\right) x(s) = \frac{gC_I}{s} + \frac{g}{2} x_d + gu_d \tag{B.19}$$

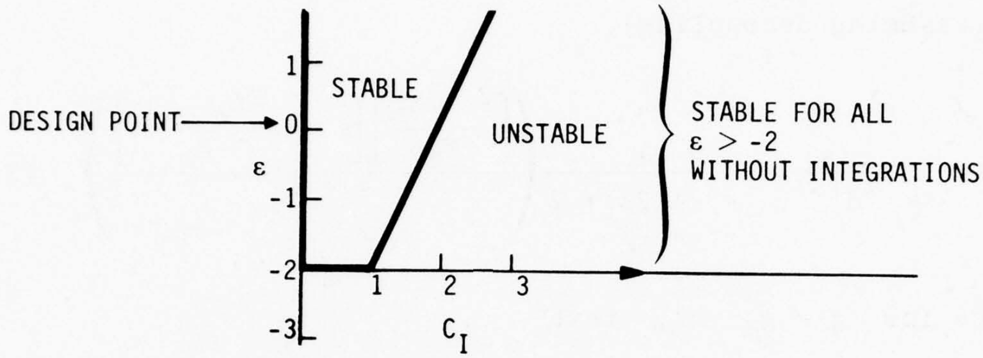


Figure B.4 Stability Limits of Integral System

or for $g = 2$,

$$(s^3 + 2s^2 + 2s + 2C_I)\ x(s) = (s + 2C_I)x_d + 2su_d \qquad (B.20)$$

With no feedforward,

$$u_d \equiv 0$$

and (B.21)

$$\frac{x(s)}{x_d(s)} = \frac{s + 2C_I}{(s^3 + 2s^2 + 2s + 2C_I)}$$

For a reasonably decoupled integral root (say 10x slower)

$$\frac{x(s)}{x_d(s)} \approx \frac{1}{s^2 + 2s + 2}\left(\frac{s + 2C_I}{s + C_I}\right) \qquad (B.22)$$

Now, let the feedforward be modeled from the assumed equilibrium condition as follows:

$$u_d = \frac{x_d}{g_m} \tag{B.23}$$

and (assuming decoupling),

$$\frac{x(s)}{x_d(s)} = \frac{1}{s^2 + 2s + 2}\left(\frac{\left[\frac{2 + g_m}{g_m}\right]\left[s + \frac{2g_m}{2 + g_m} C_I\right]}{s + C_I}\right) \tag{B.24}$$

Notice for $g = g_m = 2$, that

$$\frac{x(s)}{x_d(s)} = \frac{2}{s^2 + 2s + 2} \tag{B.25}$$

and the transient response is independent of the integral control for any input. This is a desirable property. It will not be possible to achieve this in general because of modeling inaccuracies and plant nonlinearities. However, it is intuitively clear that the more accurately that g_m approximates g, the more the system behaves like the transient regulator design without the additional integration.

The step response for various values of integral feedback gain is compared to that of the system with control reference feedforwards in Figure B.5.

The moral of the story is that integral control provides a method for compensating small reference point specification errors and plant nonlinearity but cannot replace carefully devised reference point specification algorithms because of degraded transient behavior.

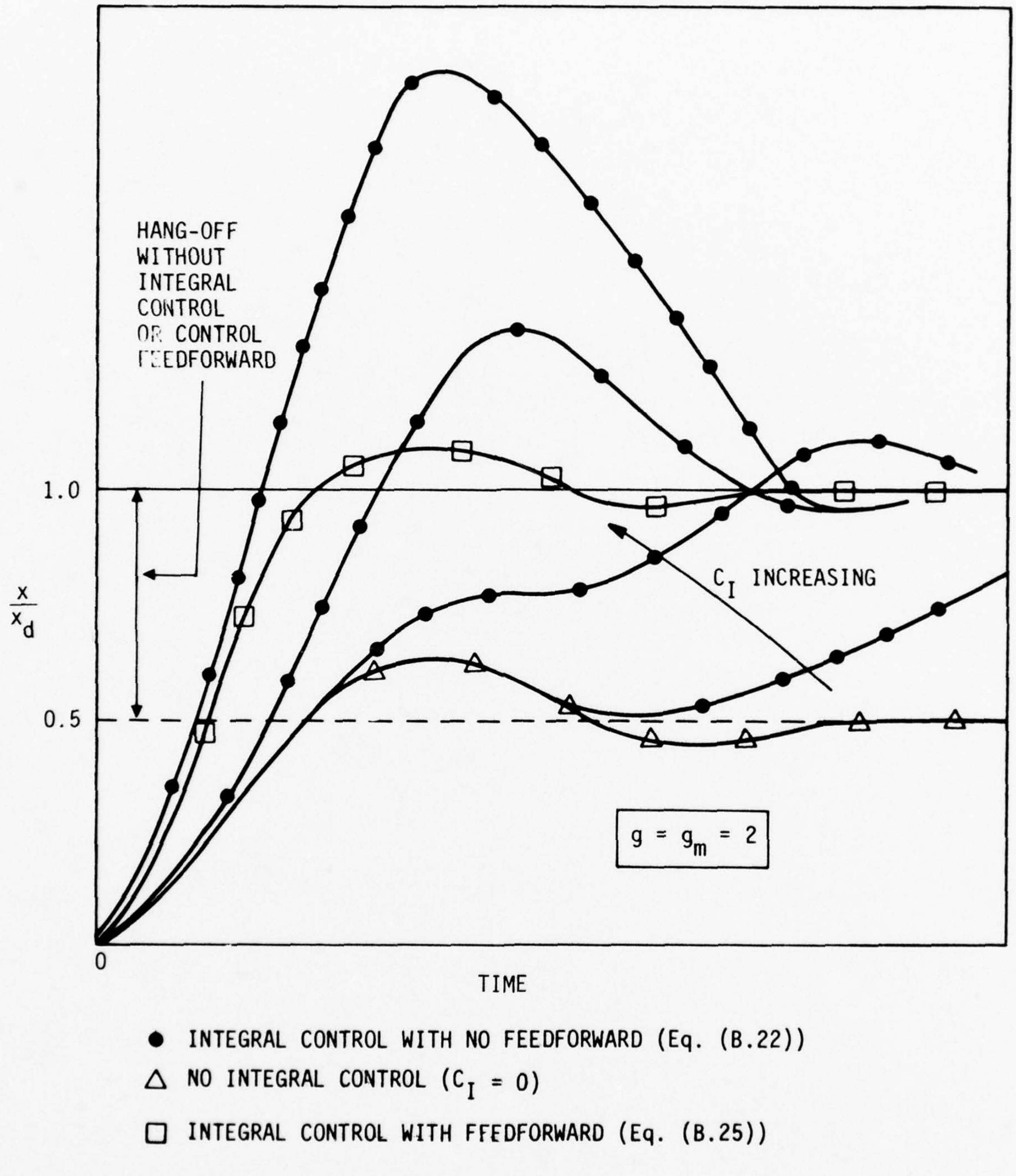


Figure B.5 Comparison of Step Response of Systems With and Without Control Reference Feedforwards

APPENDIX C

STEADY-STATE REFERENCE SCHEDULES

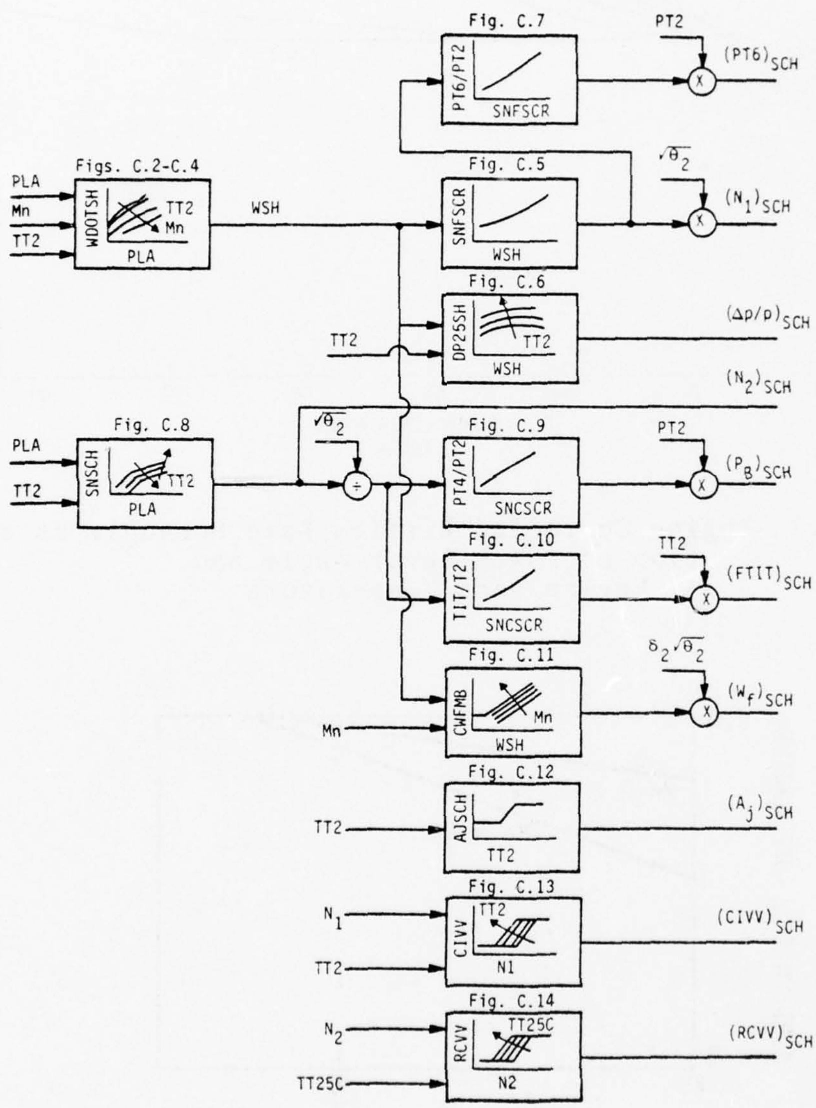


Figure C.1 Reference Schedule Algorithm Figure Index

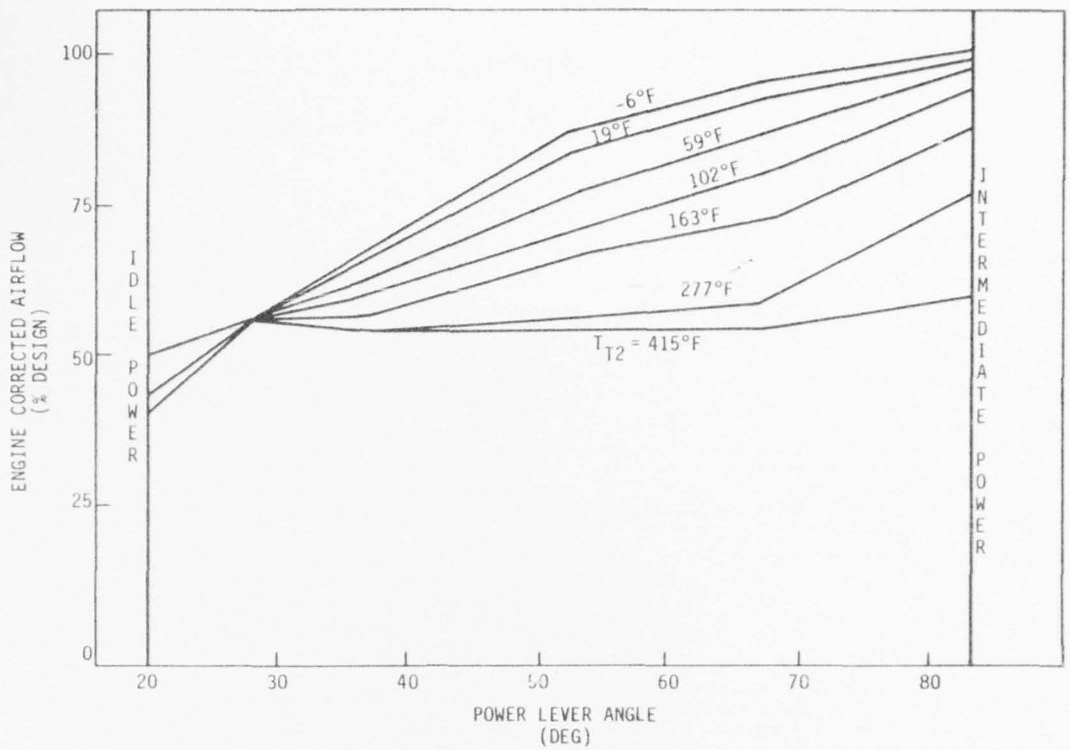


Figure C.2 Engine Corrected Airflow Base Schedule as a Function of Power Lever Angle and Engine Face Temperature

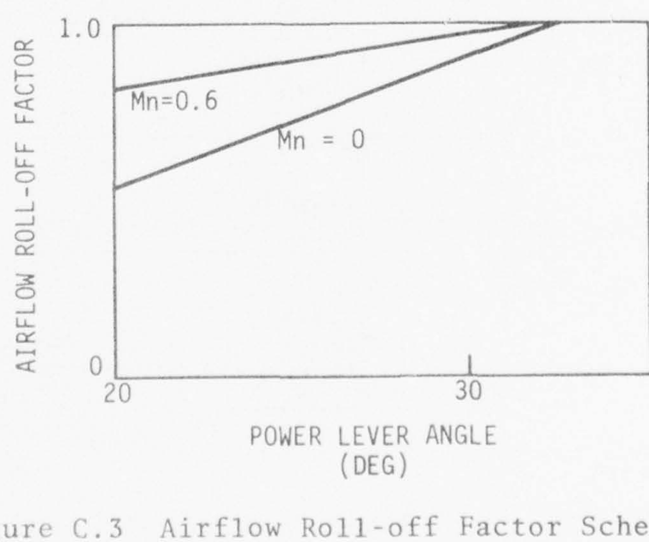


Figure C.3 Airflow Roll-off Factor Schedule for Low Speed, Low Power Modification of Scheduled Engine Airflow

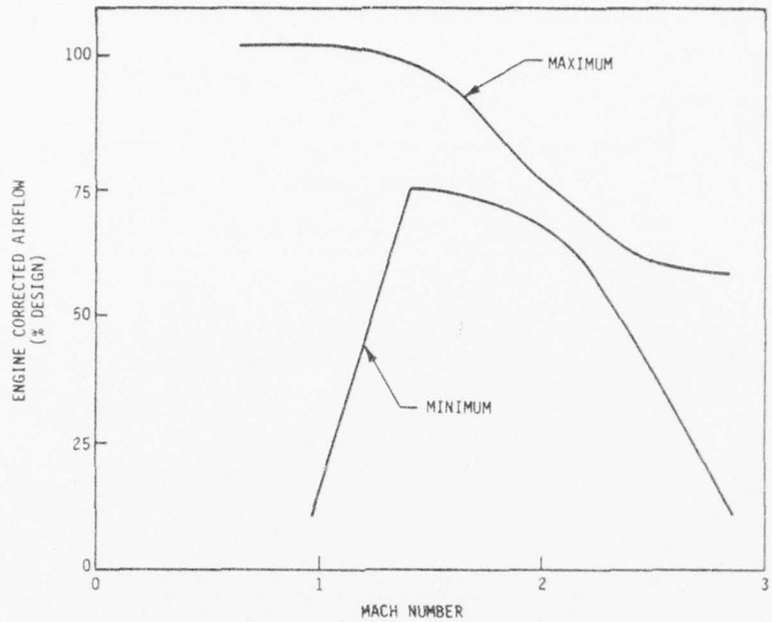


Figure C.4 Airflow Corridor Required for Inlet Compatibility at All Power Conditions

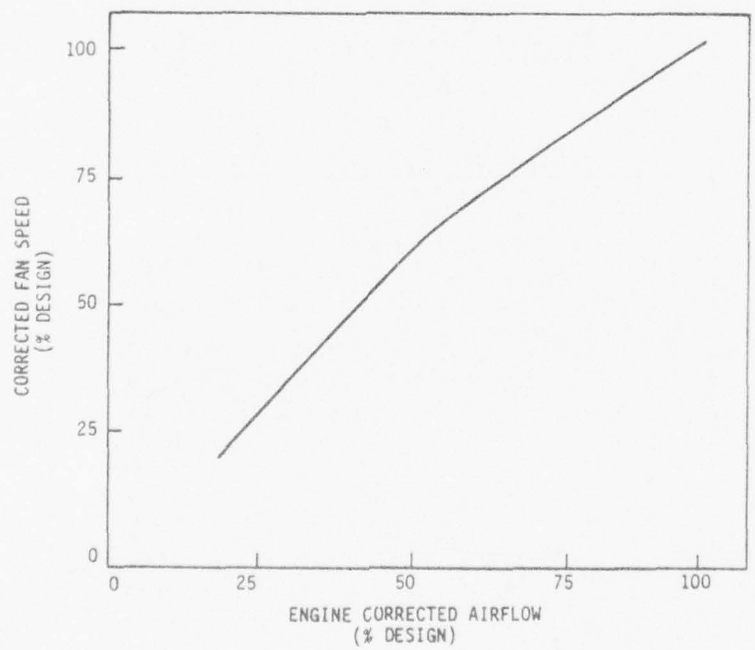


Figure C.5 Fan Speed Schedule as a Function of Scheduled Engine Airflow

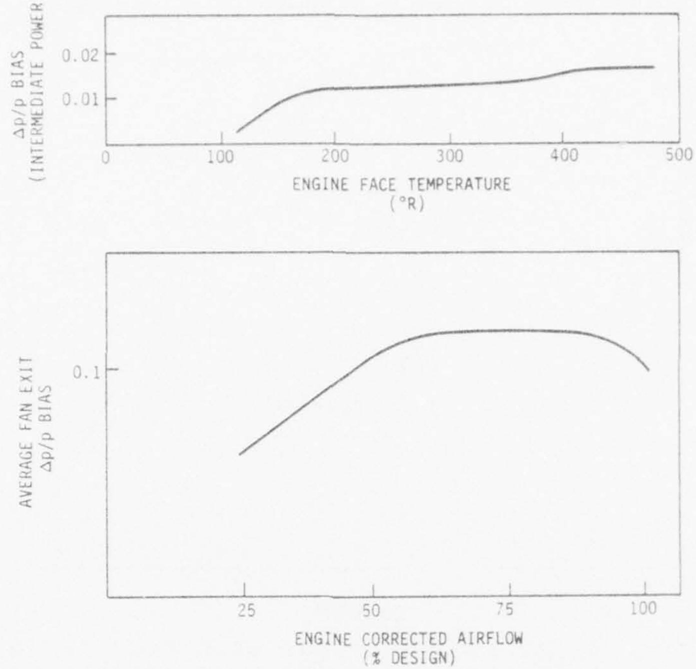


Figure C.6 Fan Match Point Schedule Consisting of a Base Schedule as a Function of Engine Airflow and an Additive Bias Shift for Supersonic Operation

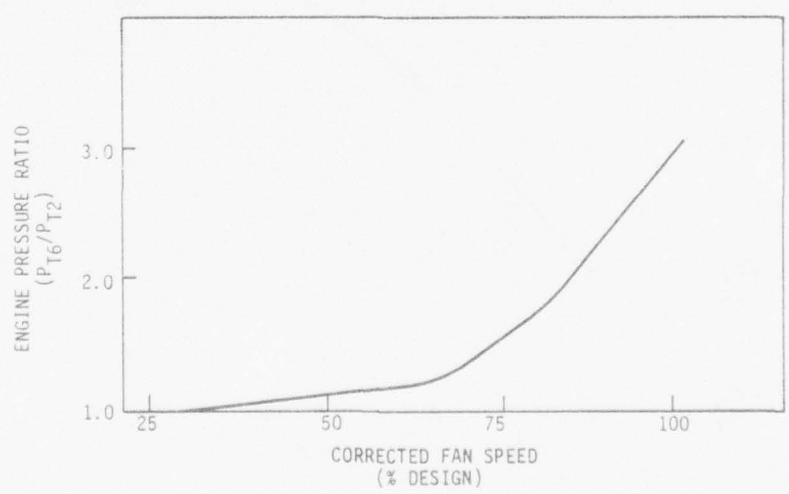


Figure C.7 Engine Pressure Ratio Schedule as a Function of Scheduled Fan Speed

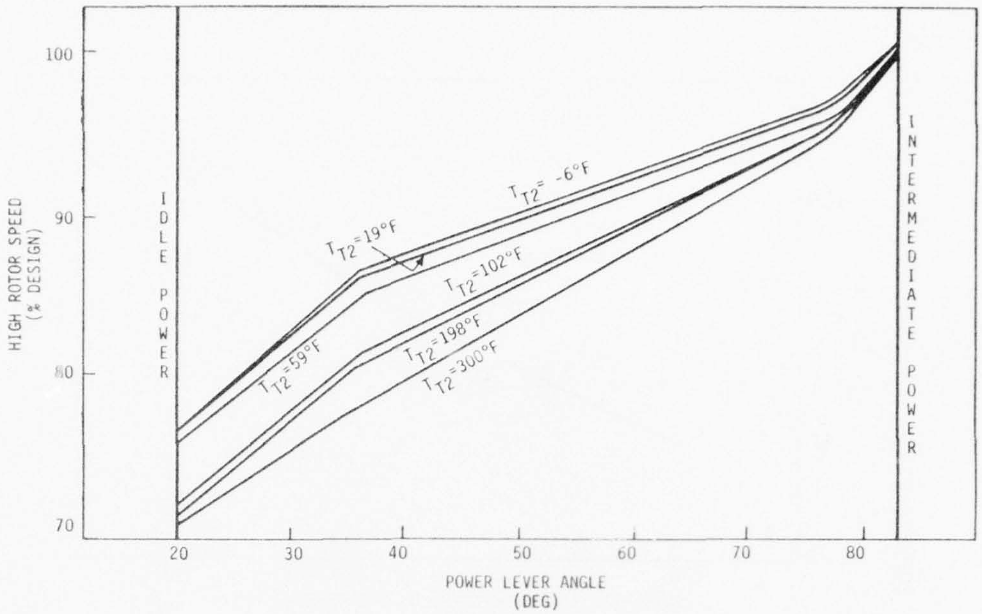


Figure C.8 Scheduled High Rotor Speed as a Function of Power Lever and Engine Face Total Temperature

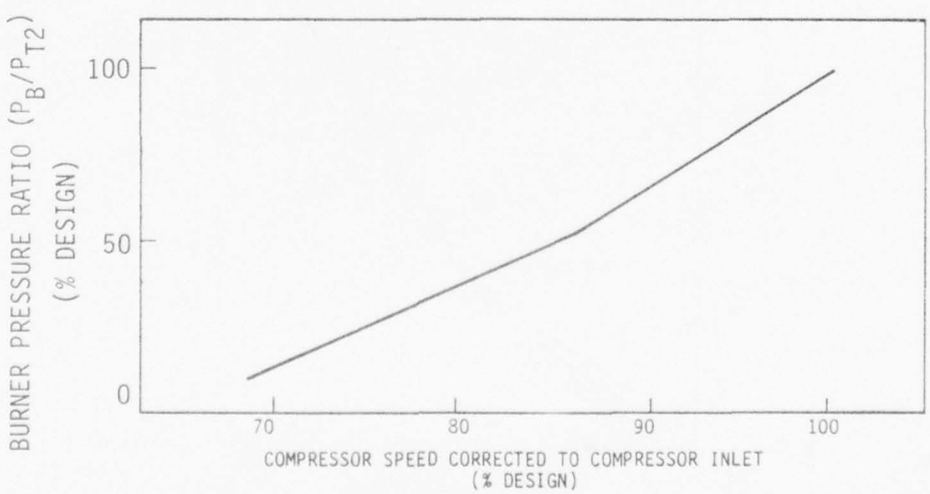


Figure C.9 Burner Pressure Ratio Schedule as a Function of Scheduled, Corrected Compressor Speed

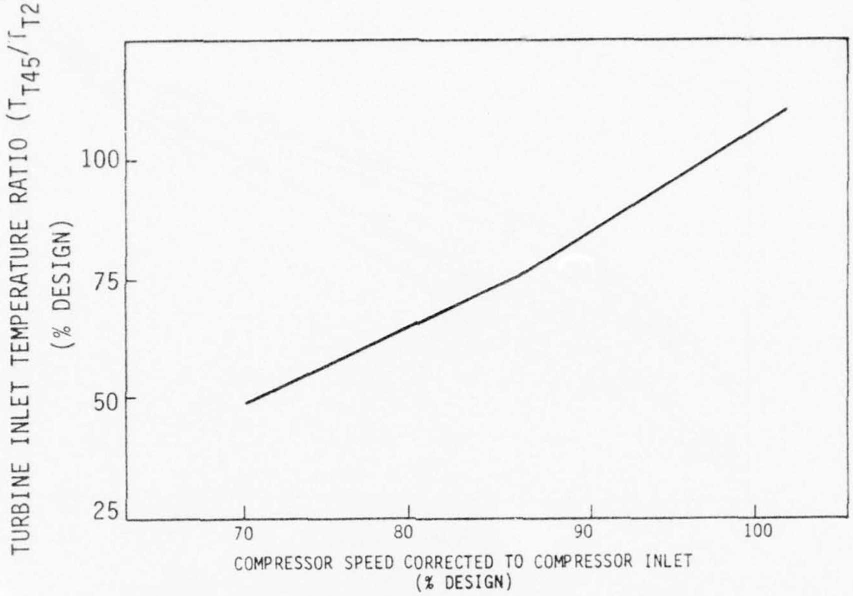


Figure C.10 Scheduled Turbine Inlet Temperature Ratio as a Function of Scheduled, Corrected Compressor Speed

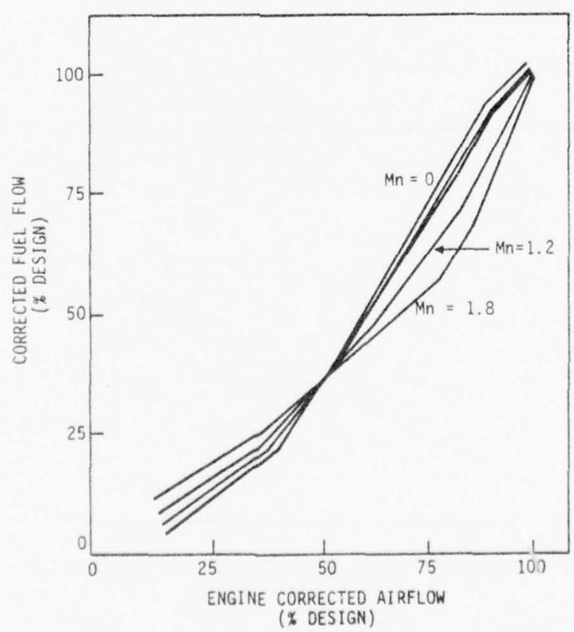


Figure C.11 Scheduled Fuel Flow as a Function of Scheduled, Corrected Airflow and Mach Number

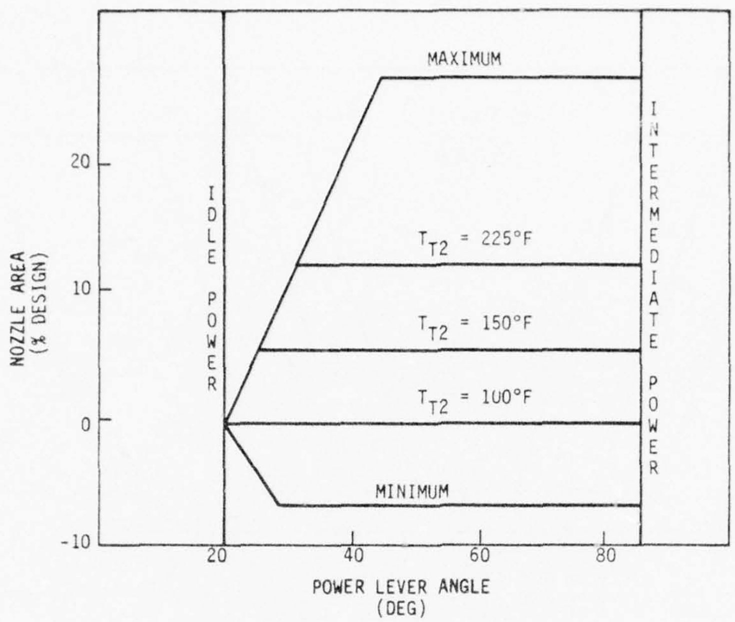


Figure C.12 Nozzle Area Scheduled as a Function of Power Lever Angle and Engine Face Total Temperature

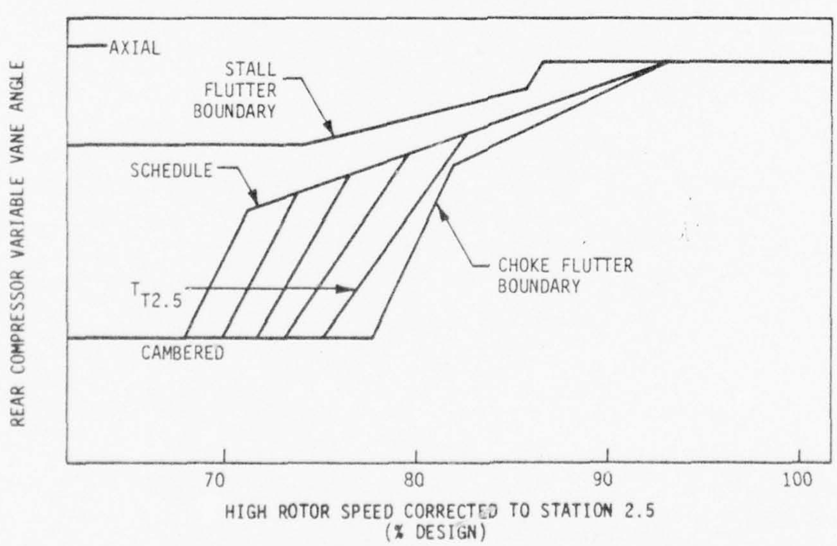


Figure C.13 Rear Compressor Variable Vane Angle Schedule as a Function of Corrected Compressor Speed and Flutter Boundary Curves

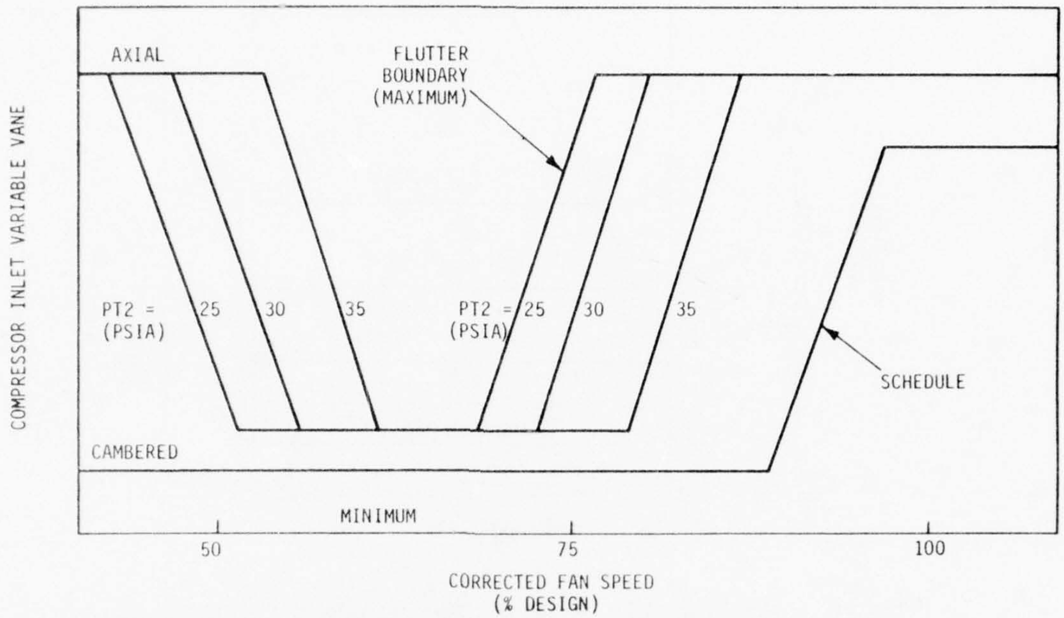


Figure C.14 Compressor Inlet Variable Vane Schedule as a Function of Corrected Fan Speed with Flutter Boundary on Maximum Deflection as a Function of Engine Face Total Pressure

APPENDIX D

LINEAR MODELS

D.1 DETAILED LINEAR MODEL ANALYSIS

Linear models were generated at a group of operating conditions throughout the flight envelope [1] . Operating conditions were specified sequentially in groups. Operating point specification was determined by insight into the behavior resulting from the dynamic analysis of the previous groups of models. The 42 operating points chosen are shown in Table D.1. The analysis of the dynamic behavior coupled with the detailed steady-state analysis contained in Chapter V produced the choice of design and evaluation points for regulator synthesis. The details of the linear model analysis of the matrices, generated by Pratt & Whitney Aircraft and included in their report [1] , are presented below.

Sea Level Static Intermediate Power Models

Linear models were generated at a series of operating points at sea level static conditions. For intermediate power, the root locations of the model are shown in Table D.2. It is possible to associate a state variable with each root by inspection of the eigenvectors of the system. A correspondence can then be found to the models of pressure, temperature and flow time constants included in the nonlinear simulation. In this way, the structure of the response can be determined in terms of predominant response variables.

The modeled state response to initial conditions for five of the engine variables has been calculated to illustrate the correspondence of eigenvector components and modal responses in the linear system. In Figure D.1, the time history of the

Table D.1

Operating Points Chosen for Dynamic/Static Analysis

CODE	POINT NO.	MACH NO.	ALTITUDE FT. (000)	PLA (DEG)	COMMENTS
Basic Set	1	0	0.0	20	Sea Level Static Operating Line
	2	0	0.0	36	
	3	0	0.0	52	
	4	0	0.0	67	
	5	0	0.0	83	
Group I	1	0	0.0	24	Additional Unchoked Model
	2	0.9	10.0	83	Performance at Max. TT4
	3	0.3	20.0	24	PB Lower Limit
	4	0.6	10.0	20	Unchoked Model Behavior
	5	0.6	30.0	24	Unchoked Model Behavior
Group II	6	1.2	0.0	83	Maximum q, PB, N1, N2, TT4
	7	2.2	40.0	83	TT3, TT4 Limit, Compressor Stab.
	8	0.9	45.0	130	Low Augmentor Pressure
	9	0.9	65.0	83	Fan Stability
	10	2.5	65.0	130	Maximum Augmentation
Extra (E)	1	0.9	10.0	36	Additional Operating Line Data for Engine Test
	2	0.9	10.0	52	
	3	0.9	10.0	67	
	4	0.9	10.0	83	
	5	0.9	30.0	36	
	6	0.9	30.0	52	
	7	0.9	30.0	67	
Group III	1	0.0	0.0	20	Minor Deck Modification
	2	0.0	0.0	20	With BLD/HPX Extraction
	3	0.0	0.0	83	Minor Deck Modification
	4	0.9	10.0	20	Additional Operating Line Data for Engine Test
	5	0.9	30.0	20	
	6	0.9	30.0	83	
Group IV	1	0.9	45.0	83	Rating Point
	2	0.9	45.0	52	Altitude Part Power Point
	3	0.9	45.0	40	Minimum Burner Pressure
	4	1.8	75.0	83	Low Density, Reynolds Index
	5	1.8	20.0	83	Maximum N1, TT3, TT4
	6	0.3	20.0	83	Fan Stability
	7	1.8	40.0	83	TT4 Limit, Compressor Stab.
	8	2.5	65.0	83	Compressor Stability
	9	2.15	58.5	83	PT2, TT2 Coverage

five states is calculated for unit initial conditions in each state. In the first column, fan speed is initially one unit away from the trim speed. As the system returns to equilibrium, it is observed that the augmentor pressure lags the fan speed. The compressor speed is nearly unaffected. The increase in fan discharge pressure is transmitted into the burner because

Table D.2

Eigenvector Association of Dynamic Roots of 16th Order Linear System

ROOT LOCATION	DOMINANT VARIABLES	COMMENTS
-501 -181	PT45 PT3	Pressure/Volume Dynamics
-42	TT4PHI	Temperature Dynamics Uncoupled Time Constants of S = -50.0
-56, -47 ± 4.8j	TT45HI TT4 TT7M	Temperature/Flow Dynamics - Modified from Original Time Constants of S = -50.0
-16, -22, -20 ± 4.2j	TT5 TT6C TT3 TT2.5C	Temperature/Flow Dynamics - Modified from Original Time Constants of S = -20.0
-2.0	TT45LO	Uncoupled Subsystem Original Time Constant of S = -2
-0.72	TT4PLO	Uncoupled Subsystem Original Time Constant of S = -0.67
-2.7	SNCOM	Rotor Inertia/Torque Balance of Core Stream
-4.03 ± 3.1j	SNFAN PT7M	Pressure/Flow work Balance for Fan Rotor

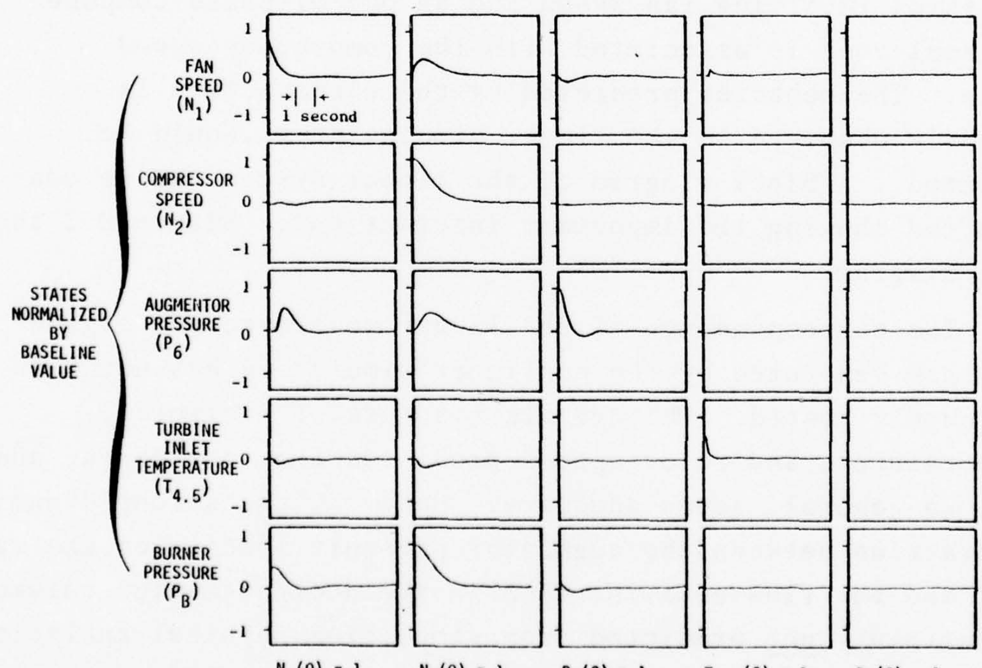


Figure D.1 Indicial Response of Fifth Order Linear Model, Intermediate Power, Sea Level Static

of the nearly constant compressor pressure ratio. As the fan speed moves to equilibrium, the burner pressure follows. For an initial condition in compressor speed, the response is nearly a simple exponential decay. The fan speed and augmentor pressure move in phase in response to the compressor speed. Burner pressure follows the compressor speed decay. For a temperature and burner pressure initial condition, the decay to equilibrium does not excite any motion in the fan, compressor speed and augmentor pressure states.

The dynamic character of the linear system is evident from the eigensystem analysis and the indicial response plots. The eigensystem shows a root with a 7 msec time constant. This root represents the flow equilibration in the burner as illustrated in the 5th column of Figure D.1. Similarly, the gas temperature response of the system at the turbine inlet also has a fast time constant relative to the rotor speed roots. The complex root near $|s| = 5$ rad/sec has response characteristics involving fan speed and an out-of-phase component. The real root is associated with the compressor speed state. The behavior predicted by the eigenvectors is directly observed in the linear simulation as would be expected. A block diagram of the linear system can be constructed showing the important interactions. Figure D.2 shows this diagram.

The correspondence of the linear models to the engine response generated by the nonlinear simulation has not been thoroughly tested. The dynamic response of pressures, temperatures, and rotor speeds predicted from the linear analysis, in general, seems adequate. However, the strong dynamic interaction between the augmentor pressure loading on the fan disc and the flow equilibration in the duct/augmentor volume is certainly not predicted from simplified physical analysis. The adverse effects of modeling inaccuracies are greatly reduced within a closed-loop feedback system such as the linear quadratic regulator. Thus, precise models in closed-loop

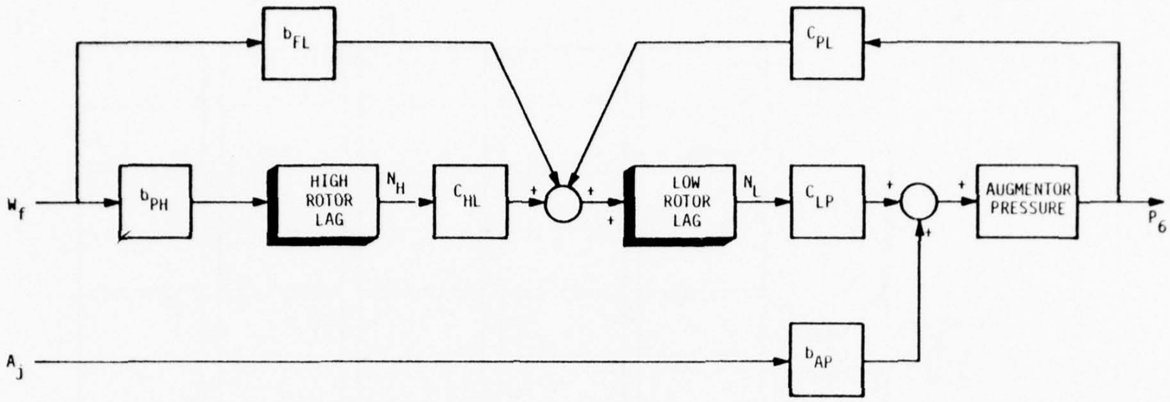


Figure D.2 Linear System Block Diagram

design are not necessary to achieve excellent performance as long as the synthesis procedure is undertaken with a recognition of the approximate nature of the representation. The linear models are used in LQR design in this spirit and with the firm understanding that they are merely a means to an end, namely, a practical controller for a real engine.

The analysis can be used on the output response of the system. Figure D.3 shows the indicial output response (i.e., the response to unit initial conditions in each state). The primary components of the thrust are the fan speed, compressor speed, and augmentor pressure.

Extension of Results to the Sea Level Static Operating Line

The applicability of the linear model to variation in power level is the next issue. In Figure D.4, the frequency response at idle and intermediate power is shown for the fuel flow to low rotor speed transfer function. At intermediate power, the low rotor is driven by the fuel flow through the cascaded high rotor speed lag. As a result, the transfer function is nearly first order with a response showing only the high rotor dynamics.

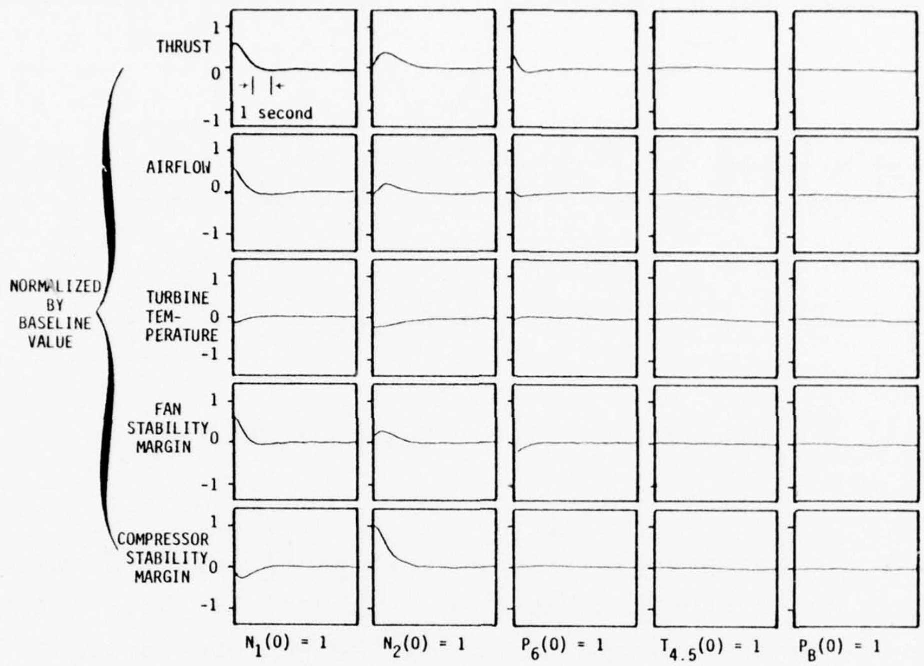


Figure D.3 Output Indicial Response

At idle, the response of low rotor speed to fuel flow shows the effects of the compressor lag. This indicates that a mode of independent low and high rotor motion, suppressed at high power, can be excited at low power. Also, the high rotor root has only one-third the response time at idle.

An intuitive explanation of this behavior is suggested from engine operation. At high power, the fan turbine operates at a constant flow parameter. Changes in high turbine inlet temperature are reflected as excess work at both turbines instantly (or nearly so). Fuel energy is converted to torque for both spools and the response of the system to fuel flow is a characteristic lag of the combined rotor system accelerating (i.e., the two spools act as a single rotor system). Pressure disturbances in the augmentor appear only at the compressor inlet because the choked turbine eliminates any back pressure sensitivity.

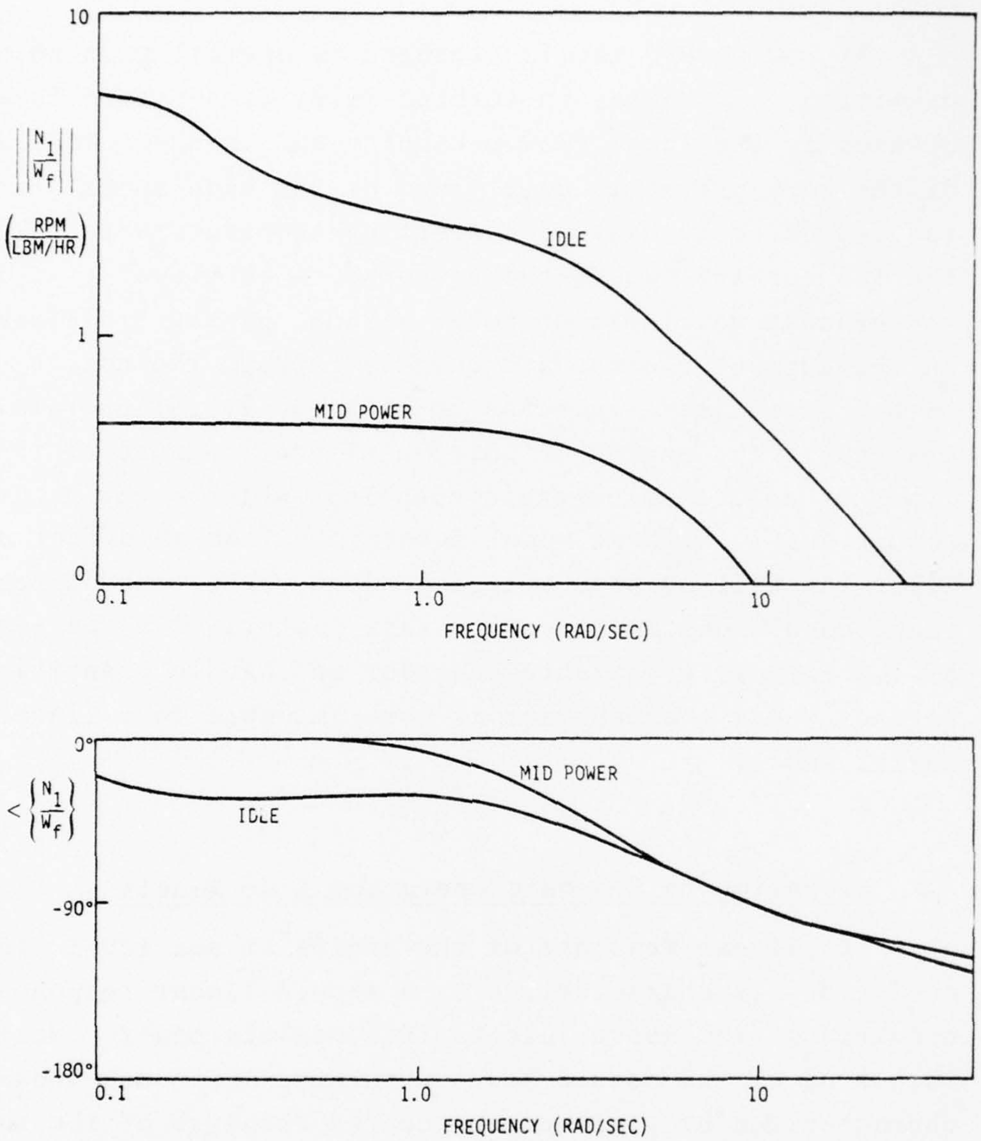


Figure D.4 Frequency Response of Linear Models at Idle and Intermediate Power at Sea Level Static Conditions

At low power, the fan turbine is operating in an unchoked condition. Increases in turbine inlet temperature cause increases in the inlet flow parameter and torque. The response of the core engine is determined by the high spool alone. The reduced effectiveness of converting temperature to torque in the fan turbine causes the response to be slower. At idle, the exhaust nozzle is unchoked. Thus, pressure disturbances in the augmentor dissipate quickly through the nozzle discharge with a significant increase in flow equilibration rate. At low power, the engine is quite nonlinear because of the many types of aero-thermodynamic couplings which occur at low flow conditions. A linear model determined from an offset derivative algorithm will be step size dependent. The control design at these conditions must operate satisfactorily in the presence of the extremely variable behavior and handle transitions to regimes where the behavior is more amenable to a linear differential model.

Extension to Subsonic Operating Line Models

The linear response of the engine at sea level static power conditions is characterized by a simple linear response at conditions from above idle to intermediate power. Near idle, unchoking of the nozzle and low turbine cause nonlinear behavior characterized by a slower, uncoupled response of the two rotor speeds. The modes of operation at various power conditions and altitude points are related to this behavior. The models can be parameterized with an ambient variable when a correspondence is found.

Figure D.5 shows the engine operating envelope. Transient operation is limited to the left by low pressure constraints and minimum airflow requirements. To the right, operation is restricted by maximum pressure, temperature and airflow requirements. This results in a narrow corridor in which transitions

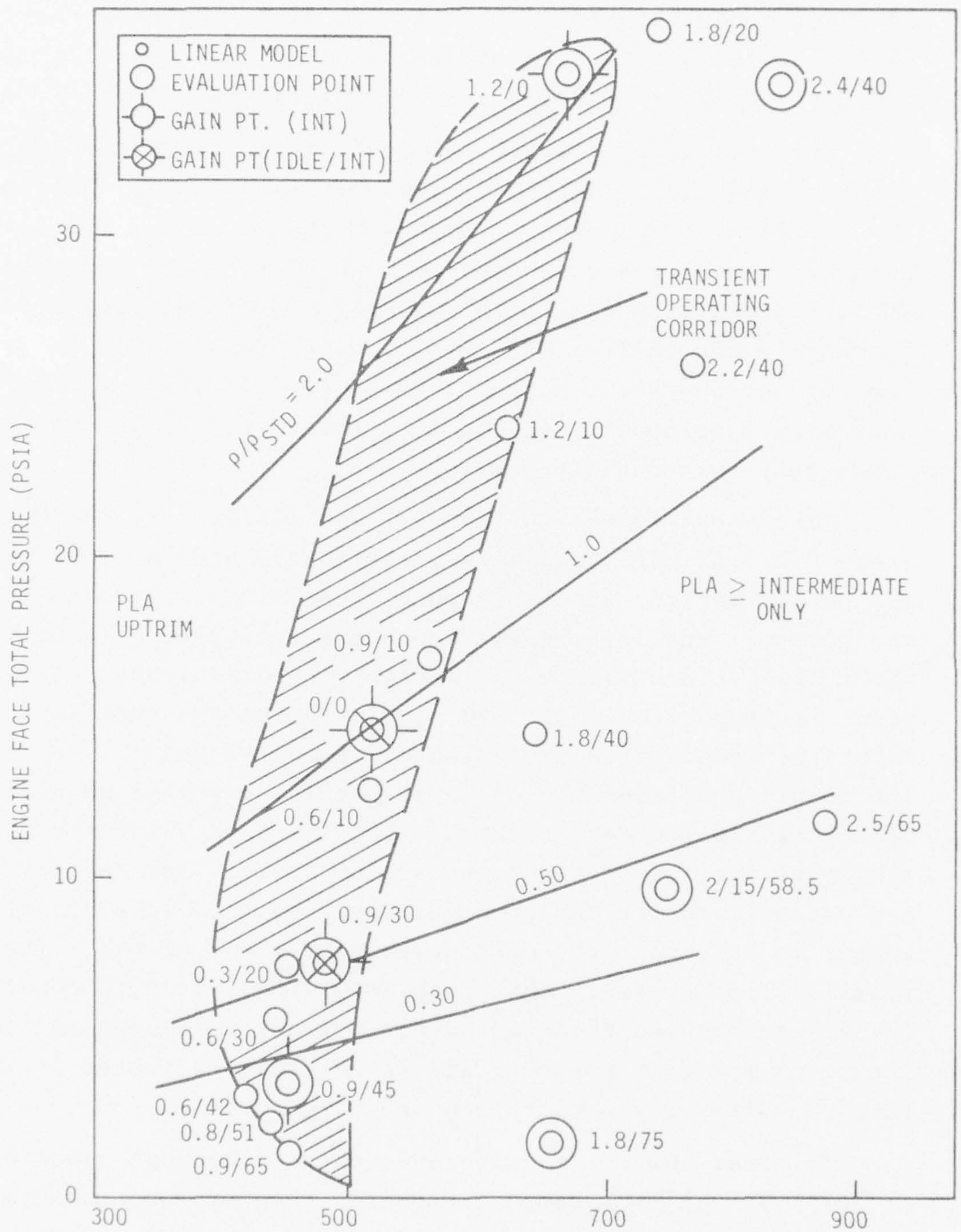


Figure D.5 Linear Model Generation Points

in power condition are permitted. In these regions, the dynamics of the plant must be understood so that practical and minimally complex controls can be implemented.

From sea level static, lower points in the transient corridor correspond to altitude, subsonic conditions. Higher in the corridor corresponds to higher Mach number and low altitude points. Two series of operating line models were generated at subsonic altitude points. At 30K/0.9, the ambient pressure is roughly one-half of sea level static and at 45K/0.9, it is roughly one quarter. Higher than 45,000 ft, the subsonic operating envelope is limited by pressure constraints to include only intermediate power.

Part power models for 45K/0.9 and 30K/0.9 are shown in Table D.3. At both conditions, the nozzle and fan turbine are choked for the series of power conditions. At high power, the pressure and rotor speed roots are uncoupled. Since the rotor speed time constant at a fixed, nondimensional match point is proportional to $\delta\sqrt{\theta}$ [69] and the pressure equilibration time constant is approximately proportioned to $\sqrt{\theta}$ [70], the coupling between these states should be weaker at higher altitudes and low Mach numbers. For the high rotor speed time constant, these relations are accurate. For the low rotor and pressure roots, the coupling terms in the linear models appear to be important, particularly at low airflows. The root locations reflect this coupling. Thus, at high power, the system has two uncoupled dynamic roots corresponding to the rotor speed response. This behavior is reflected in the 30K/0.9, 45K/0.9 and 65K/0.9 models.

At lower powers, a different behavior becomes apparent at 30K/0.9. In this case, there is a complex root associated with the spool response. The coupling is probably due to the load on the compressor face caused by changes in fan speed and discharge pressure. This effect is not dynamically important at higher pressures or airflows because of the decreased sensitivity of compressor speed to compressor entrance

Table D.3

Eigenvalues of Linear Models at Part Power Conditions at 30,000 Ft and 45,000 Ft, Mach Number = 0.9

83/30K/0.9	67/30K/0.9	52/30K/0.9	36/30K/0.9	20/30K/0.9	83/45K/0.9	52/45K/0.9	40/45K/0.9
-514	-553	-455	-495	-480	-592	-568	-498
-206	-144	-206	-143	-120	-172	-133	-150
-65	-54	-57	-55	-57	-57	-60	-55
-53	-50 ± 14j	-52	-50 ± 5j	-51	-51	-53	-47
-43		-43 ± 1j		-44 ± 2j	-46	-43 ± 2j	-48 ± 2j
-36	-43		-44		-45		
-22 ± .8j	-23	-19 ± 7j	-19 ± 2j	-21 ±.4j	-21 ± 3j	-22 ± 1j	-18 ± 3j
-18 ± 8j	-22 ± 2j	-22	-22	-20	-22	-17 ± 5j	-20
	-18	-20 ± .2j	-20	-19	-17		-20
-17	-14		-17	-17	-16	-19	-21
-9.9*	-7.32*	-3.4*	-5.4*	-6.5*	-6.6*	-3.1*	-5.6*
-2.6*	-4.07*	-2.4 ± 1j*	-1.9± .3j*	-1.2±.5j*	-1.9*	-2.6*	-1.4*
-1.7± .1j*	-1.29*				-0.56*		
	-2	-2	-1.7	-2	-2	-2	-2
-0.54	-0.7	-0.7	-0.7	-0.7	-0.7	-.7 ± .1j*	-.7 ± .1j*

*Dominant roots

perturbations. It should be noted that the dynamics of the states are closely coupled at these points. This contrasts with the response of the system at the higher power conditions where the system is more uncoupled.

The conclusions concerning altitude points can be summarized as follows. The high power behavior predominantly corresponds to uncoupled rotor speed dynamics. At low power conditions, moderate altitudes and Mach numbers, the spool responses couple to form a moderately damped complex pair. This behavior is probably produced by the increased sensitivity of the high pressure spool to compressor face disturbances.

Several other subsonic points were investigated. These points were generally low altitude, low Mach number at intermediate and idle power. Figure D.5 shows the low turbine Choking parameter $T_{T4.5}/T_{T2}$ as a function of airflow. The low turbine is observed to run unchoked in a region of the flight envelope at low altitude and Mach number conditions. The eigenvalues of the models generated to investigate this regime are listed in Table D.4. These models demonstrate the response predicted by the unchoked turbine behavior. It can be seen that the character of the roots changes significantly, even at points which are quite close together in the envelope (e.g., 30K/0.9, 30K/0.6 and 20K/0.3). This is indicative of the sensitivity of the linear dynamics to the chosen operating point; or, stated another way, the nonlinearity of the plant in this region.

Extension to Transonic, Low Altitude Points

The behavior of the engine at conditions corresponding to higher inlet pressures and temperatures in the upper half of the transient corridor was investigated with models along the operating line at 10K/0.9 and intermediate power at 0K/1.2. These results are shown in Table D.5.

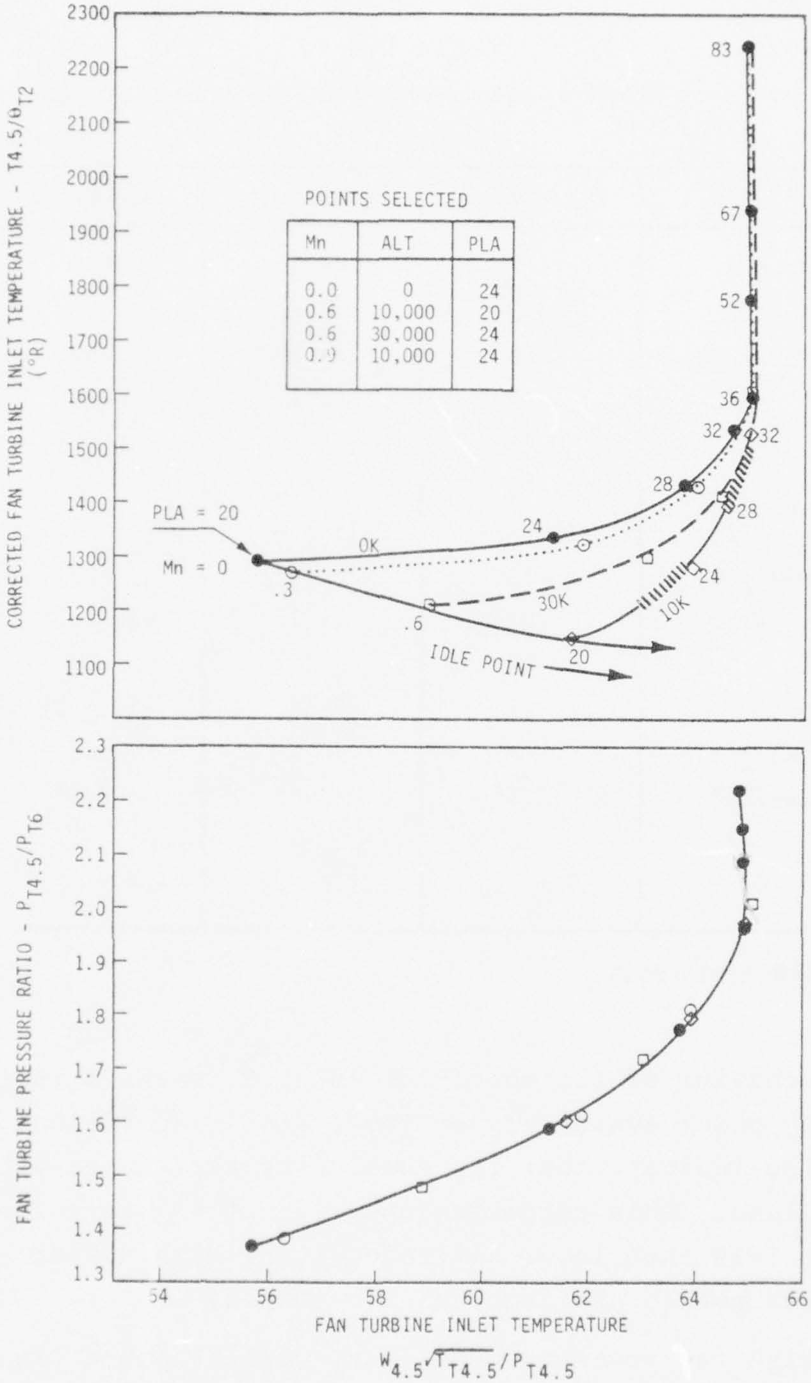


Figure D.5 Fan Inlet Flow Parameter at Low Mach, Low Altitude Flight Points Showing Turbine Choking Characteristics

Table D.4
Eigenvalues of Miscellaneous Subsonic Linear Models

83/20K/0.3	24/20K/0.3	20/10K/0.6	24/30K/0.6
-608	-527	-622	-570
-126	-130	-150	-128
-50 ± 20j	-56	-58	-57
-54	-50	-51	-51
-43	-46	-45	-46 ± 1j
-27	-45	-42	
-21	-15 ± 2j	-15 ± 4j	
-19 ± 3j	-16	-20 ± 1j	-20
-13	-21	-21	-20 ± 1j
	-20		
	-21	-17	-18 ± 2j
-5 ± 2j*			-5.5
-1.25*	-1.5*	-1.9*	-2.6*
-2	-2	-2	-2
-0.7	-.7 ± .2j*	-.7 ± .2j	-.7 ± .2j*

*Dominant roots

The behavior of the models at 10K/0.9 is characteristic of the high power system at sea level static conditions. The results also indicate that the model does not change along the operating line. This condition operates at higher corrected airflow at idle than lower altitude, lower Mach number points and both the nozzle and turbines are choked.

The high ram pressure condition, 0K/1.2, has a limited power level range because of airflow constraints near intermediate power. The response of the engine is similar to the sea level static, intermediate behavior. The response times of the roots are about 30% less than at sea level static.

Table D.5

Eigenvalues of Transonic Operating Points

83/10K/0.9	67/10K/0.9	52/10K/0.9	36/10K/0.9	20/10K/0.9	83/0/1.2
-585	-490	-538	-577	-617	-572
-213	-204	-158	-170	-120	
-67	-56	-58	-62	-51 ± 16j	-61
-53	-47 ± 5j	-48 ± 3j	-52	-52	-46
-45	-41	-42	-44	-43	-35
-32	-21 ± 4j	-18 ± 4j	-38	-20	-23
-15 ± 9j	-23	-21 ± .3j	-21 ± .7j	-26	-19
-22	-20	-19	-17 ± 7j	-21 ± .8j	-20 ± 2j
-20 ± 2j	-17		-20	-12	-14
-8 ± 2j*	-3.9 ± 3j*	-3.8 ± 4j*	-3 ± 3j	-5.6±1.7j*	-7 ± 4j*
-3*	-4.4*	-2.9*	-3.4	-1.1*	-5*
-2	-2	-2	-2	-2	-2
-0.7	-0.7	-0.7	-0.7	-0.8	-0.7

*Dominant roots

The conclusions concerning the behavior in this portion of the envelope are summarized below. The eigensystem of the models in this region of the envelope is similar to the sea level static, intermediate power. The response times of the engine decrease as a function of the position in the envelope with the sea level ram point being about 30% faster than the sea level static response.

Extension to Supersonic Conditions

Several supersonic points were chosen to investigate engine dynamic response. These points range from very low to very

high ram pressures and at higher than standard inlet temperatures. Airflow limits constrain the engine to intermediate power (and above). Thus, these points lie to the right of the transient operating corridor. The control requirements at these points are compensation of disturbances due to augmentor lights and inlet distortion.

Three groups of models were chosen. These were low pressure, mid-pressure, and high pressure points in the right side of the envelope. The results from the model analysis for each group is presented below.

The low pressure points consisted of 75K/1.8 and 58.5K/2.15. The model at 75K/1.8 is very similar to that at 65K/0.9 and other subsonic altitude points. The rotor speed responses are coupled. The pressure lag of the augmentor is considerably faster. Control of pressure pulses at this condition due to augmentor lighting can be detected using a pressure measurement. A disturbance in the augmentor propagates quickly to the fan exit station, well before the spool speeds have responded. At 58.5K/2.15, the operating point has the same density as 30K/0.9 but at a higher pressure and temperature. The corrected airflow at this point corresponds to approximately a PLA of 35° at 30K/0.9. The 36°/30K/0.9 model is similar to the model at 83°/58.5K/2.15.

The mid-power supersonic points were 65K/2.5 and 40K/1.8. At 40K/1.8, the model has coupled rotor roots. This point has roughly the same pressure as sea level static and roughly the same temperature as the 0K/1.2 point. The behavior is quite different than either of these points. It lies along a constant density line corresponding to 20K/0.9 conditions at a PLA of approximately 40°. No models were generated at this point but extrapolation of the low power, 30K/0.9 behavior would indicate a system response of the type exhibited by the 40K/1.8 model. At 2.5/65K, the operating point has the same density as 30K/0.9 at extremely high inlet temperatures. The

airflow is low, corresponding to 28°/30K/0.9. The model does not exhibit this type of behavior; rather, it is more typical of the sea level static response at low power.

The high pressure points consisted of 20K/1.8 and 40K/2.2 at intermediate power. The 20K/1.8 corresponds to the density at 0K/1.2 with higher pressures and temperatures. The behavior of these models is nearly identical. The 40K/2.2 operating point has the same pressure as 0K/1.2, and roughly the same temperature as 58.5K/2.15 at a lower density than 0K/1.2. The response has a coupled rotor system. This behavior does not correspond to any other high pressure system. It has the same characteristics, however, as 58.5K/2.15 linear system.

The conclusions important in the analysis of the supersonic operating conditions are as follows. The low pressure supersonic points are similar to the corresponding constant density operating points at subsonic altitude points with the same corrected airflow. Higher temperatures tend to destroy this correspondence.

Supplemental Models

A linear model was generated at the 45K/0.9 flight point at maximum (full augmented) power. This point is representative of the flight conditions where pressure spike suppression during augmentor ignition is important. The low ambient pressure and fan stability margin at intermediate power make this flight point critical to satisfactory augmentor operation. A comparison of the intermediate and maximum power model roots are shown in Table D.6. During augmentor operation, the engine airflow is nearly constant and the operation of the core engine and fan should be the same throughout augmented operation. It is important to analyze the differences in the transient behavior to assess the impact of differences on performance.

Table D.6

Eigenvalues of Intermediate Power and Maximum Power Systems at 45,000 Ft, Mach Number = 0.9

83/45K/0.9	130/45K/0.9
-592	-540
-172	-151
-57	-55
-51	$-49 \pm 6j$
-46	
-45	-44
$-21 \pm 3j$	$-18 \pm 3j$
-22	-22
-20	-21
-16	-19
-6.6*	-6.3*
-1.9*	$-1.2 \pm 0.4j$*
-0.6*	
-2	-2
-0.7	-0.7

*Dominant roots

Recalling the intermediate model at these flight conditions contained an uncoupled set of real roots, the fully augmented roots exhibited lower frequency, coupled, spool response. Since augmentor control is primarily pressure modulation, the pressure dynamics of both models are similar.

A linear model was generated at sea level static idle conditions with the full specified level of component deterioration, horsepower extraction and bleed flow. It was determined that sea level static idle conditions were the most sensitive to installation and deterioration effects. The results are

shown in Table D.7. Clearly, the impact on the engine dynamics is small while the change of the control effectiveness is more pronounced.

Table D.7

Eigenvalues of Models at Sea Level Static, Idle Power With and Without Full Installation and Deterioration Effects

20/0K/0 NONE	20/0K/0 NOMINAL
-831	-827
-144	-146
-87	-52
$-50 \pm 0.1j$	$-50 \pm 2j$
-21	-44
-20	-20
$-25 \pm 8j$	$-25 \pm 3j$
-20	-20
-24	-21
$-5 \pm 2j$	$-4.7 \pm 2j$
$-0.7 \pm .2j$	$-0.7 \pm .2j$
-2	-2

D.2 SELECTED LINEAR MODELS

$$\delta\dot{x} = F\delta x + G\delta u$$

$$\delta y = H\delta x + D\delta u$$

Note 1: For state, control and output ordering, see printout and symbol table.

Note 2: Models are normalized by the baseline operating point (with the exceptions shown below) so that units of all quantities are dimensionless.

$$(DP25QT)_{NOM} = 1.0$$

$$(DP25SC)_{NOM} = 1.0$$

Note 3: Table D.8 lists the linear models included.

Table D.8
Index of Linear Model Data

CASE	PLA (DEG)	ALTITUDE (FT)	MACH NO.	COMMENTS
1	83	0	0	
2	52	0	0	
3	24	0	0	
4	24	0	0	Static reduction on T_{T4LO}
5	20	0	0	
6	20	0	0	Nominal extractions; Static Reduction on T_{T4LO}
7	20	0	0	
8	83	30,000	0.9	
9	20	30,000	0.9	
10	83	0	1.2	
11	83	45,000	0.9	

F100 LINEAR MODEL   83/0/0K   2/12/76

**** THE MATRICES IN FINAL FORM ****

CASE 1

F-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
SNFAN	-4.3320+000	2.1273-001	-2.9846+000	2.5083-002	1.9326-001	0.0000	3.9498+000	-1.5053-001	7.0752-002	-1.5293-001
SNCOM	-3.5069-001	-5.6480+000	-1.4079+000	1.2812-001	3.7160+000	0.0000	-1.8074+000	1.5526+000	1.1600-001	-3.0490-001
PT7M	2.0431+000	-4.8604+000	-1.0050+001	2.5753+000	4.8087-001	0.0000	3.7445+000	3.5327+000	-1.7035-001	-7.8238-001
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	2.8304+001	2.0846+002	1.1641+002	3.1747+000	-1.6450+002	0.0000	-7.2618-001	-1.6532+002	-1.0305+001	2.0637+001
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5000-001	0.0000	0.0000	0.0000	0.0000
PT45	5.4376+001	-1.3832+001	4.3090+001	3.1196+001	4.9724+002	0.0000	-5.7810+002	-6.9709+001	-8.3385+000	-3.5619+001
TT25H	1.1154+001	-1.9905-001	2.0851+000	2.9313-001	-5.0692-003	0.0000	-6.9713-002	-1.9780+001	-1.6860-001	-4.3085-002
TT25C	8.9975+000	-1.9267-001	4.4071+000	-2.2916-001	-3.1481-002	0.0000	-2.3926-002	-5.9180-002	-2.0450+001	-5.2892-002
TT3	-6.6588-001	7.5000+000	-2.8641+000	-4.9780-001	4.2563+000	0.0000	5.9243-002	1.5059+001	2.9943-001	-1.9970+001
TT4PHI	-4.2235-002	-9.0136-002	-1.4742-001	2.0841-001	1.9723-002	0.0000	9.3875-004	2.0655-001	1.5963-002	3.8550+000
TT4PLO	-5.6341-003	-1.2057-002	-1.9604-002	2.7754-002	2.5922-003	0.0000	1.1267-004	2.7494-002	2.1408-003	5.1396-001
TT4	-4.1396+000	-2.9118+001	-1.7767+001	2.0230+001	3.2667+000	0.0000	3.7034-001	2.6114+001	1.8587+000	1.8365+001
TT45HI	-1.4346-001	-3.0705+000	-6.1005-001	7.8795-001	-1.0342+001	0.0000	1.0285+001	8.9456-001	5.6160-002	7.5427+000
TT45LO	-5.7037-002	-1.2277+000	-2.4395-001	3.1346-001	-4.1374+000	0.0000	4.1152+000	3.5790-001	2.2907-002	3.0172+000
TT5	-9.1520-001	-1.7871+000	3.3758+000	4.5109-001	-5.0592+000	0.0000	1.2903+000	6.9248-001	4.6555-002	3.7201+000
TT6C	-1.6370-001	5.0610-001	3.0867-001	2.5498-002	-5.8760-002	0.0000	-7.4982-003	-4.4112-001	1.9661+001	2.3986-001
TT7M	-1.1916+001	1.6921+001	1.0191+001	1.0969+000	-1.0186+000	0.0000	8.0663+000	-1.4772+001	-1.0817+000	-6.1727-001

F-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	2.4645-001	1.6144-002	-1.2005+000	1.8029+000	1.8850-001	-1.3296-001	-1.6141-002	-1.2821-002
SNCOM	2.2318+000	2.3456-001	-9.4684-001	-1.5619-002	-1.6362-002	-1.6728-002	-4.1648-002	-1.5996-002
PT7M	1.0504-001	-3.6678-001	-2.9383+000	-4.2569-001	-4.3324-001	1.4686+000	8.0374-002	-4.3661-001
WFCOM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	3.9490-001	4.9682-001	4.5058+001	5.2228-001	5.4776-001	5.7306-001	2.7014+000	5.2234-001
FTIT	0.0000	0.0000	0.0000	2.2507-001	2.5008-002	0.0000	0.0000	0.0000
PT45	-7.8480+001	-1.2388+001	1.7144+002	-3.8562+000	-4.0486+000	-3.9045+000	-3.0375+000	-4.0488+000
TT25H	-5.1973-002	-5.0699-002	-1.5211-002	-4.6885-002	-4.6902-002	-4.4362-002	8.8726-003	-4.6906-002
TT25C	8.5630-002	8.9408-002	-1.5111-002	9.3180-002	9.3189-002	1.0326-001	1.1456-001	9.3178-002
TT3	3.4122-002	2.9626-002	7.7282-003	2.9627-002	2.9622-002	2.9618-002	-2.6404-002	2.9625-002
TT4PHI	-5.0000+001	-4.6945-003	4.6016+001	-3.7553-003	-3.7553-003	-8.4471-003	-5.6348-003	-4.6947-003
TT4PLO	-6.0003+000	-6.6720-001	6.1360+000	-4.5068-004	-4.5065-004	-1.1268-003	-7.8869-004	-5.6335-004
TT4	1.9641-001	1.8032-001	-4.7690+001	1.7388-001	1.7147-001	1.6585-001	-1.6420-001	1.7145-001
TT45HI	-1.2775+001	-1.4236+000	5.9643+001	-5.0000+001	0.0000	-9.9836-003	-1.6217-002	-3.7431-003
TT45LO	-5.1102+000	-5.6913-001	2.3854+001	-1.8000+001	-2.0000+000	-3.5933-003	-6.2896-003	-1.3471-003
TT5	-6.2848+000	-6.9847-001	2.9336+001	-3.3525+000	-3.6964-001	-1.9780+001	-2.8881-002	-5.3484-004
TT6C	-2.4993-003	-2.4993-003	7.1222-002	-2.4994-003	-2.4994-003	-2.5000-003	-2.0000+001	-2.5000-003
TT7M	9.4136-001	-1.2002-002	-5.1334+000	-1.4059-001	-1.2002-001	3.9313+001	1.0921+001	-5.0140+001

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G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	0.0000	-1.0607-001	1.8127-002	5.2231-004	9.5605-002
SNCOM	0.0000	-1.1608-001	1.0613-003	-1.8531-002	2.3521-001
PT7M	0.0000	-6.5882+000	-2.0194-002	-2.0633-002	-2.3878+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	0.0000	9.9991+000	-7.4012-002	5.3099-001	-1.7362+002
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT45	0.0000	5.3030+000	4.0991-002	1.2169-001	3.3700-001
TT25H	0.0000	2.6131-001	-2.1997-002	-2.5740-003	-1.5767-001
TT25C	0.0000	1.2658-001	-2.0744-002	1.6460-003	-9.0357-001
TT3	0.0000	-2.6283-001	1.1570-003	3.0934-002	8.1819-001
TT4PHI	0.0000	-5.8956-003	1.7016-004	-5.8998-004	-2.6139+000
TT4PLO	0.0000	-7.6319-004	2.2656-005	-7.8222-005	-3.4847-001
TT4	0.0000	-1.6389+000	7.2338-003	-6.9514-002	2.8965+001
TT45HI	0.0000	-3.9040-002	3.0805-004	-2.3993-003	-3.5883+000
TT45LO	0.0000	-1.6086-002	1.1745-004	-9.5756-004	-1.4347+000
TT5	0.0000	2.3681-002	-2.1122-004	-1.8178-003	-1.4747+000
TT6C	0.0000	3.3957-002	1.8240-003	1.2421-003	-4.3040-002
TT7M	0.0000	8.4772-001	1.0903-001	4.4853-002	-1.0490-001

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
FNMX	3.3261-001	-5.9229-001	6.5338-002	-3.5518-002	1.3652-001	0.0000	6.4380-001	5.3928-001	4.0283-002	-4.6488-002
WFAN	6.1767-001	1.7228-004	-1.9746-003	5.9175-003	0.0000	0.0000	0.0000	-1.8555-004	1.7233-004	0.0000
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	3.9581+000	3.6697-001	-3.3209+000	1.1445-001	7.4384-004	0.0000	6.8874-002	-2.7053-001	3.4662-001	2.9619-002
SMHC	8.3320-001	8.2255+000	3.5799+000	3.8052-001	-5.1375+000	0.0000	-7.3789-002	-4.2850+000	-3.7470-001	-3.2527-002
DP25QT	1.6631-001	-3.7048-001	-6.6009-001	-4.8873-002	4.7498-002	0.0000	1.4112-002	3.4185-001	1.7019-001	6.4978-003
DP25SC	9.5342-002	5.7653-002	-1.7076-001	-1.1453-002	-3.4821-003	0.0000	3.6480-003	3.5063-002	6.1063-002	1.8368-003

H-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	8.8500-002	1.4036-002	-3.7962-001	4.4344-003	5.0607-003	4.1534-001	1.1017-001	5.1659-003
WFAN	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TT4	0.0000	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	3.7364-002	3.4020-002	9.2951-003	3.2228-002	3.2226-002	3.0678-002	-2.9685-002	3.2475-002
SMHC	3.9417-002	-3.6815-002	-9.4970-003	-3.5319-002	-3.5008-002	-3.3772-002	3.3771-002	-3.5132-002
DP25QT	7.8205-003	7.5249-003	2.0507-003	6.8561-003	6.8568-003	6.3679-003	-5.5563-003	6.7009-003
DP25SC	2.1701-003	2.1462-003	5.1268-004	1.8480-003	1.8481-003	1.8609-003	-1.2279-003	1.8486-003

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D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	0.0000	-7.9141-002	-3.7765-003	-1.5500-003	7.2050-002
WFAN	0.0000	4.1774-003	-5.1350-003	4.8079-006	-5.3411-007
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	-1.7341-001	5.2597-002	2.5801-003	1.6825-001
SMHC	0.0000	3.4194-001	-1.3768-003	-2.3762-002	-4.6623-001
DP25GT	0.0000	-3.6629-002	-2.3977-003	-7.8320-004	6.0940-002
DP25SC	0.0000	-7.1980-003	-1.0576-003	2.5100-004	1.3000-002

IGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
			18	(0.00000)+J(0.00000)	.0000000	.00000
(-5.77397+002)+J(0.00000)	0.00000	1.00000	1	(-6.86804-003)+J(0.00000)	-.0068680	.00000
			2	(3.11880-003)+J(0.00000)	.0031188	.00000
			3	(-6.58327-003)+J(0.00000)	-.0065833	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.78685-003)+J(0.00000)	.0027868	.00000
			6	(7.87631-006)+J(0.00000)	.0000079	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(2.84443-004)+J(0.00000)	.0002844	.00000
			9	(2.14724-004)+J(0.00000)	.0002147	.00000
			10	(-2.16972-004)+J(0.00000)	-.0002170	.00000
			11	(6.82230-005)+J(0.00000)	.0000682	.00000
			12	(9.05550-006)+J(0.00000)	.0000091	.00000
			13	(-8.12159-004)+J(0.00000)	-.0008122	.00000
			14	(-1.93417-002)+J(0.00000)	-.0193417	.00000
			15	(-7.69866-003)+J(0.00000)	-.0076987	.00000
			16	(-2.32697-003)+J(0.00000)	-.0023270	.00000
			17	(5.19150-006)+J(0.00000)	.0000052	.00000
			18	(-1.52547-002)+J(0.00000)	-.0152547	.00000

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(-1.74625+002)+J( 0.00000    )  0.00000        1.00000   1  (-2.48106-002)+J( 0.00000     )  -.0248106        .00000
                                                         2  (-8.10456-003)+J( 0.00000     )  -.0081046        .00000
                                                         3  (-2.61547-002)+J( 0.00000     )  -.0261547        .00000
                                                         4  ( 0.00000     )+J( 0.00000     )   .0000000        .00000
                                                         5  ( 8.25827-001)+J( 0.00000     )   .8258274        .00000
                                                         6  (-1.87602-006)+J( 0.00000     )  -.0000019        .00000
                                                         7  ( 1.00000+000)+J( 0.00000     )  1.0000000        .00000
                                                         8  ( 2.59144-003)+J( 0.00000     )   .0025914        .00000
                                                         9  ( 2.51447-003)+J( 0.00000     )   .0025145        .00000
                                                        10  (-2.35599-002)+J( 0.00000     )  -.0235599        .00000
                                                        11  ( 1.07404-002)+J( 0.00000     )   .0107404        .00000
                                                        12  ( 1.39676-003)+J( 0.00000     )   .0013968        .00000
                                                        13  (-2.76255-002)+J( 0.00000     )  -.0276255        .00000
                                                        14  ( 1.39321-003)+J( 0.00000     )   .0013932        .00000
                                                        15  ( 5.42217-004)+J( 0.00000     )   .0005422        .00000
                                                        16  ( 2.52399-002)+J( 0.00000     )   .0252399        .00000
                                                        17  ( 1.51308-004)+J( 0.00000     )   .0001513        .00000
                                                        18  (-6.61622-002)+J( 0.00000     )  -.0661622        .00000

(-5.89480+001)+J( 0.00000    )  0.00000        1.00000   1  (-2.59231-002)+J( 0.00000     )  -.0259231        .00000
                                                         2  (-1.57144-002)+J( 0.00000     )  -.0157144        .00000
                                                         3  ( 6.07302-003)+J( 0.00000     )   .0060730        .00000
                                                         4  ( 0.00000     )+J( 0.00000     )   .0000000        .00000
                                                         5  (-6.44443-002)+J( 0.00000     )  -.0644443        .00000
                                                         6  (-3.99583-003)+J( 0.00000     )  -.0039958        .00000
                                                         7  (-1.44102-001)+J( 0.00000     )  -.1441021        .00000
                                                         8  ( 8.15827-003)+J( 0.00000     )   .0081583        .00000
                                                         9  ( 2.29491-003)+J( 0.00000     )   .0022949        .00000
                                                        10  ( 6.18726-003)+J( 0.00000     )   .0061873        .00000
                                                        11  ( 3.34307-001)+J( 0.00000     )   .3343068        .00000
                                                        12  ( 4.12618-002)+J( 0.00000     )   .0412618        .00000
                                                        13  (-6.54943-002)+J( 0.00000     )  -.0654943        .00000
                                                        14  ( 1.00000+000)+J( 0.00000     )  1.0000000        .00000
                                                        15  ( 3.78929-001)+J( 0.00000     )   .3789286        .00000
                                                        16  ( 1.86431-001)+J( 0.00000     )   .1864314        .00000
                                                        17  (-9.86260-004)+J( 0.00000     )  -.0009863        .00000
                                                        18  (-7.56604-001)+J( 0.00000     )  -.7566040        .00000
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(-5.00462+001)+J( 0.00000   )  0.00000      1.00000  1  ( 8.05030-004)+J( 0.00000   )   .0008050    .00000
                                                     2  ( 8.40310-005)+J( 0.00000   )   .0000840    .00000
                                                     3  ( 9.76127-003)+J( 0.00000   )   .0097613    .00000
                                                     4  ( 0.00000    )+J( 0.00000   )   .0000000    .00000
                                                     5  ( 1.41316-002)+J( 0.00000   )   .0141316    .00000
                                                     6  ( 6.70620-005)+J( 0.00000   )   .0000671    .00000
                                                     7  ( 7.79117-003)+J( 0.00000   )   .0077912    .00000
                                                     8  ( 5.26858-004)+J( 0.00000   )   .0005269    .00000
                                                     9  (-4.75263-003)+J( 0.00000   )  -.0047526    .00000
                                                    10  (-2.25920-003)+J( 0.00000   )  -.0022592    .00000
                                                    11  (-5.75279-003)+J( 0.00000   )  -.0057528    .00000
                                                    12  (-7.01005-004)+J( 0.00000   )  -.0007010    .00000
                                                    13  ( 3.20675-004)+J( 0.00000   )   .0003207    .00000
                                                    14  (-1.42434-002)+J( 0.00000   )  -.0142434    .00000
                                                    15  (-5.34473-003)+J( 0.00000   )  -.0053447    .00000
                                                    16  (-1.90029-003)+J( 0.00000   )  -.0019003    .00000
                                                    17  ( 3.14805-003)+J( 0.00000   )   .0031480    .00000
                                                    18  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000

(-3.88570+001)+J( 0.00000   )  0.00000      1.00000  1  ( 4.76347-003)+J( 0.00000   )   .0047635    .00000
                                                     2  (-6.43748-002)+J( 0.00000   )  -.0643748    .00000
                                                     3  ( 1.92562-002)+J( 0.00000   )   .0192562    .00000
                                                     4  ( 0.00000    )+J( 0.00000   )   .0000000    .00000
                                                     5  ( 1.10553-002)+J( 0.00000   )   .0110553    .00000
                                                     6  (-5.62227-004)+J( 0.00000   )  -.0005622    .00000
                                                     7  (-5.84554-002)+J( 0.00000   )  -.0584554    .00000
                                                     8  (-2.90106-003)+J( 0.00000   )  -.0029011    .00000
                                                     9  (-1.20577-002)+J( 0.00000   )  -.0120577    .00000
                                                    10  ( 2.69731-002)+J( 0.00000   )   .0269731    .00000
                                                    11  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                    12  ( 1.18208-001)+J( 0.00000   )   .1182082    .00000
                                                    13  ( 2.39846-001)+J( 0.00000   )   .2398465    .00000
                                                    14  ( 9.26542-002)+J( 0.00000   )   .0926542    .00000
                                                    15  ( 3.40720-002)+J( 0.00000   )   .0340720    .00000
                                                    16  (-2.55567-002)+J( 0.00000   )  -.0255567    .00000
                                                    17  ( 1.28514-002)+J( 0.00000   )   .0128514    .00000
                                                    18  (-2.27430-001)+J( 0.00000   )  -.2274300    .00000
```

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(-4.76710+001)+J(0.00000)	0.00000	1.00000	1	(-2.72619-002)+J(0.00000)	-.0272619	.00000
			2	(8.29645-003)+J(0.00000)	.0082965	.00000
			3	(1.88001-002)+J(0.00000)	.0188001	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.26851-002)+J(0.00000)	.0126851	.00000
			6	(-3.22075-003)+J(0.00000)	-.0032207	.00000
			7	(1.59987-002)+J(0.00000)	.0159987	.00000
			8	(1.25265-002)+J(0.00000)	.0125265	.00000
			9	(-8.85828-005)+J(0.00000)	-.0000886	.00000
			10	(-1.16222-002)+J(0.00000)	-.0116222	.00000
			11	(-1.54046-001)+J(0.00000)	-.1540464	.00000
			12	(-1.86491-002)+J(0.00000)	-.0186491	.00000
			13	(-6.65063-003)+J(0.00000)	-.0066506	.00000
			14	(6.51535-001)+J(0.00000)	.6515349	.00000
			15	(2.43490-001)+J(0.00000)	.2434901	.00000
			16	(5.35378-002)+J(0.00000)	.0535378	.00000
			17	(4.94630-005)+J(0.00000)	.0000495	.00000
			18	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.79165+001)+J(4.39010+000)	1.84465+001	.97127	1	(-2.03358-002)+J(-1.00562-002)	.0226863	-153.68728
			2	(-1.46225-002)+J(-3.50593-002)	.0379864	-112.64000
			3	(-4.79146-002)+J(1.56124-002)	.0503940	161.95242
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(4.68642-002)+J(-4.17574-002)	.0627689	-41.70194
			6	(-8.39347-004)+J(-3.61720-003)	.0037133	-103.06389
			7	(2.64083-002)+J(-4.14275-002)	.0491288	-57.48416
			8	(-5.85034-002)+J(7.23909-002)	.0930757	128.94377
			9	(-8.15968-003)+J(3.52685-002)	.0362001	103.02668
			10	(6.94448-002)+J(1.64551-001)	.1786046	67.11898
			11	(1.58638-001)+J(2.57760-001)	.3026652	58.38979
			12	(1.82221-002)+J(2.49864-002)	.0309251	53.89752
			13	(8.05181-002)+J(1.80789-001)	.1979087	65.99323
			14	(1.31080-001)+J(2.58360-001)	.2897102	63.09890
			15	(4.82201-002)+J(8.27359-002)	.0957622	59.76555
			16	(7.81313-001)+J(1.52017-001)	.7959640	11.01027
			17	(1.18466-001)+J(8.79716-002)	.1475572	36.59725
			18	(1.00000+000)+J(0.00000)	1.0000000	.00000

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(-6.71900+000)+J(1.29305+000)	6.84229+000	.98198	1	(3.22297-001)+J(5.61134-001)	.6471061	60.12838
			2	(5.27996-003)+J(-1.20625-001)	.1207401	-87.49366
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(3.87476-001)+J(-3.72815-001)	.5377067	-43.89526
			6	(-2.73774-003)+J(-1.74818-002)	.0176948	-98.90053
			7	(3.43754-001)+J(-2.94822-001)	.4528651	-40.61818
			8	(4.60992-001)+J(4.24944-001)	.6269697	42.66999
			9	(5.75834-001)+J(3.29871-001)	.6636262	29.80654
			10	(4.57915-001)+J(2.32068-001)	.5133634	26.87558
			11	(1.63172-001)+J(4.31746-001)	.4615511	69.29669
			12	(1.52791-002)+J(1.49455-002)	.0213733	44.36758
			13	(1.04328-001)+J(3.89895-001)	.4036118	75.01975
			14	(1.72560-001)+J(4.79260-001)	.5093790	70.19834
			15	(5.90559-002)+J(6.72495-002)	.0894991	48.71163
			16	(4.50199-001)+J(6.79129-001)	.8147974	56.45933
			17	(9.00504-001)+J(3.82764-001)	.9784766	23.02816
			18	(6.57427-001)+J(2.50004-001)	.7033580	20.82061

(-1.84161+001)+J(0.00000)	0.00000	1.00000	1	(-1.81328-003)+J(0.00000)	-.0018133	.00000
			2	(-2.74681-004)+J(0.00000)	-.0002747	.00000
			3	(1.25082-002)+J(0.00000)	.0125082	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.77915-002)+J(0.00000)	.0277915	.00000
			6	(9.36736-005)+J(0.00000)	.0000937	.00000
			7	(1.75955-002)+J(0.00000)	.0175955	.00000
			8	(-4.87952-003)+J(0.00000)	-.0048795	.00000
			9	(8.02856-002)+J(0.00000)	.0802856	.00000
			10	(6.82392-003)+J(0.00000)	.0068239	.00000
			11	(-4.55360-003)+J(0.00000)	-.0045536	.00000
			12	(-4.57604-004)+J(0.00000)	-.0004576	.00000
			13	(-3.54870-003)+J(0.00000)	-.0035487	.00000
			14	(-7.29399-003)+J(0.00000)	-.0072940	.00000
			15	(-2.39969-003)+J(0.00000)	-.0023997	.00000
			16	(-9.28307-002)+J(0.00000)	-.0928307	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
			18	(2.37226-001)+J(0.00000)	.2372260	.00000

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(-6.48252-001)+J( 0.00000    ) 0.00000      1.00000   1  ( 1.24050-001)+J( 0.00000    )   .1240499      .00000
                                                      2  ( 1.38041-001)+J( 0.00000    )   .1380408      .00000
                                                      3  (-4.49684-002)+J( 0.00000    )  -.0449684      .00000
                                                         ( 0.00000     )+J( 0.00000    )   .0000000      .00000
                                                      5  ( 1.25629-001)+J( 0.00000    )   .1256286      .00000
                                                         ( 4.13980-003)+J( 0.00000    )   .0041398      .00000
                                                      7  ( 7.78638-002)+J( 0.00000    )   .0778638      .00000
                                                      8  ( 6.23816-002)+J( 0.00000    )   .0623816      .00000
                                                      9  ( 4.87333-002)+J( 0.00000    )   .0487333      .00000
                                                     10  ( 1.34673-001)+J( 0.00000    )   .1346733      .00000
                                                     11  ( 3.16131-002)+J( 0.00000    )   .0316131      .00000
                                                     12  ( 1.00000+000)+J( 0.00000    )  1.0000000      .00000
                                                     13  ( 2.26083-002)+J( 0.00000    )   .0226083      .00000
                                                     14  (-6.43778-003)+J( 0.00000    )   .0064378      .00000
                                                     15  (-7.98632-003)+J( 0.00000    )  -.0079863      .00000
                                                     16  (-3.71893-002)+J( 0.00000    )  -.0371893      .00000
                                                     17  ( 5.11502-002)+J( 0.00000    )   .0511502      .00000
                                                     18  (-2.33920-002)+J( 0.00000    )  -.0233920      .00000

(-2.06903+001)+J( 0.00000    ) 0.00000      1.00000   1  ( 1.94517-002)+J( 0.00000    )   .0194517      .00000
                                                      2  ( 1.00695-002)+J( 0.00000    )   .0100695      .00000
                                                      3  (-7.11105-002)+J( 0.00000    )  -.0711105      .00000
                                                      4  ( 0.00000     )+J( 0.00000    )   .0000000      .00000
                                                      5  (-7.51108-002)+J( 0.00000    )  -.0751108      .00000
                                                      6  ( 8.55131-004)+J( 0.00000    )   .0008551      .00000
                                                      7  (-7.59256-002)+J( 0.00000    )  -.0759256      .00000
                                                      8  ( 5.23998-003)+J( 0.00000    )   .0052400      .00000
                                                      9  ( 1.54517-002)+J( 0.00000    )   .0154517      .00000
                                                     10  (-1.17745-001)+J( 0.00000    )  -.1177447      .00000
                                                     11  (-7.58199-002)+J( 0.00000    )  -.0758199      .00000
                                                     12  (-7.92522-003)+J( 0.00000    )  -.0079252      .00000
                                                     13  (-3.84043-002)+J( 0.00000    )  -.0384043      .00000
                                                     14  (-7.48644-002)+J( 0.00000    )  -.0748644      .00000
                                                     15  (-2.51656-002)+J( 0.00000    )  -.0251656      .00000
                                                     16  ( 8.80808-001)+J( 0.00000    )   .8808077      .00000
                                                     17  (-3.63883-001)+J( 0.00000    )  -.3638827      .00000
                                                     18  ( 1.00000+000)+J( 0.00000    )  1.0000000      .00000
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(-2.62888+000)+J( 0.00000    )  0.00000      1.00000   1  ( 1.00000+000)+J( 0.00000    )   .0000000     .00000
                                                       2  ( 6.78541-001)+J( 0.00000    )   .6785414     .00000
                                                       3  ( 3.86668-001)+J( 0.00000    )   .3866685     .00000
                                                       4  ( 0.00000    )+J( 0.00000    )   .0000000     .00000
                                                       5  ( 7.88283-001)+J( 0.00000    )   .7882834     .00000
                                                       6  (-2.08219-002)+J( 0.00000    )   .0208219     .00000
                                                       7  ( 6.53737-001)+J( 0.00000    )   .6537367     .00000
                                                       8  ( 6.76907-001)+J( 0.00000    )   .6769067     .00000
                                                       9  ( 5.92791-001)+J( 0.00000    )   .5927914     .00000
                                                      10  ( 9.85029-001)+J( 0.00000    )   .9850295     .00000
                                                      11  ( 2.72106-001)+J( 0.00000    )   .2721057     .00000
                                                      12  (-4.37957-002)+J( 0.00000    )   .0437957     .00000
                                                      13  ( 1.97620-001)+J( 0.00000    )   .1976202     .00000
                                                      14  ( 2.64626-001)+J( 0.00000    )   .2646262     .00000
                                                      15  (-4.00954-001)+J( 0.00000    )   .4009538     .00000
                                                      16  ( 2.07153-001)+J( 0.00000    )   .2071526     .00000
                                                      17  ( 6.82336-001)+J( 0.00000    )   .6823357     .00000
                                                      18  ( 2.43677-001)+J( 0.00000    )   .2436768     .00000

(-2.20014+001)+J( 0.00000    )  0.00000      1.00000   1  ( 6.28471-003)+J( 0.00000    )   .0062847     .00000
                                                       2  ( 6.06074-003)+J( 0.00000    )   .0060607     .00000
                                                       3  (-2.54321-002)+J( 0.00000    )   .0254321     .00000
                                                       4  ( 0.00000    )+J( 0.00000    )   .0000000     .00000
                                                       5  ( 2.44658-003)+J( 0.00000    )   .0024466     .00000
                                                       6  ( 6.24645-004)+J( 0.00000    )   .0006246     .00000
                                                       7  (-9.07196-003)+J( 0.00000    )   .0090720     .00000
                                                       8  ( 6.66601-005)+J( 0.00000    )   .0000667     .00000
                                                       9  (-1.00676-001)+J( 0.00000    )   .1006757     .00000
                                                      10  (-4.77783-002)+J( 0.00000    )   .0477783     .00000
                                                      11  (-5.86317-002)+J( 0.00000    )   .0586317     .00000
                                                      12  (-6.23004-003)+J( 0.00000    )   .0062300     .00000
                                                      13  (-3.14466-002)+J( 0.00000    )   .0314466     .00000
                                                      14  (-5.81671-002)+J( 0.00000    )   .0581671     .00000
                                                      15  (-1.98013-002)+J( 0.00000    )   .0198013     .00000
                                                      16  ( 3.08627-001)+J( 0.00000    )   .3086266     .00000
                                                      17  ( 1.00000+000)+J( 0.00000    )   .0000000     .00000
                                                      18  ( 8.17426-001)+J( 0.00000    )   .8174259     .00000
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(-1.90745+000)+J( 0.00000    )  0.00000       1.00000   1  ( 1.66761-001)+J( 0.00000    )   .1667606     .00000
                                                       2  ( 6.57972-002)+J( 0.00000    )   .0657972     .00000
                                                       3  (-2.66818-002)+J( 0.00000    )  -.0266818     .00000
                                                       4  ( 0.00000    )+J( 0.00000    )   .0000000     .00000
                                                       5  ( 2.92382-002)+J( 0.00000    )   .0292382     .00000
                                                       6  (-2.52502-002)+J( 0.00000    )  -.0252502     .00000
                                                       7  ( 1.91554-002)+J( 0.00000    )   .0191554     .00000
                                                       8  ( 9.60330-002)+J( 0.00000    )   .0960330     .00000
                                                       9  ( 7.95169-002)+J( 0.00000    )   .0795169     .00000
                                                      10  ( 1.15570-001)+J( 0.00000    )   .1155701     .00000
                                                      11  ( 7.07822-002)+J( 0.00000    )   .0707822     .00000
                                                      12  (-2.35639-002)+J( 0.00000    )  -.0235639     .00000
                                                      13  ( 6.41236-002)+J( 0.00000    )   .0641236     .00000
                                                      14  ( 7.48346-002)+J( 0.00000    )   .0748346     .00000
                                                      15  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                      16  ( 4.73601-002)+J( 0.00000    )   .0473601     .00000
                                                      17  ( 8.54648-002)+J( 0.00000    )   .0854648     .00000
                                                      18  (-4.02946-003)+J( 0.00000    )  -.0040295     .00000

(-1.00000+001)+J( 0.00000    )  0.00000       1.00000   1  ( 3.16248-001)+J( 0.00000    )   .3162483     .00000
                                                       2  ( 2.08761-002)+J( 0.00000    )   .0208761     .00000
                                                       3  ( 4.96976-001)+J( 0.00000    )   .4969759     .00000
                                                       4  (-6.52085-001)+J( 0.00000    )  -.6520851     .00000
                                                       5  ( 3.55694-002)+J( 0.00000    )   .0355694     .00000
                                                       6  (-4.53331-004)+J( 0.00000    )  -.0004533     .00000
                                                       7  (-5.44931-002)+J( 0.00000    )  -.0544931     .00000
                                                       8  ( 4.34009-001)+J( 0.00000    )   .4340089     .00000
                                                       9  ( 5.06835-001)+J( 0.00000    )   .5068354     .00000
                                                      10  ( 5.69055-001)+J( 0.00000    )   .5690546     .00000
                                                      11  ( 1.53714-002)+J( 0.00000    )   .0153714     .00000
                                                      12  ( 1.10066-003)+J( 0.00000    )   .0011007     .00000
                                                      13  (-3.13748-002)+J( 0.00000    )  -.0313748     .00000
                                                      14  ( 1.91337-002)+J( 0.00000    )   .0191337     .00000
                                                      15  ( 4.53956-003)+J( 0.00000    )   .0045396     .00000
                                                      16  ( 2.18296-001)+J( 0.00000    )   .2182962     .00000
                                                      17  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                      18  ( 3.19464-001)+J( 0.00000    )   .3194645     .00000
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T-MATRIX

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-6.8680-003	-2.4811-002	-2.5923-002	8.0503-004	4.7635-003	-2.7262-002	8.4327-002	-4.8242-002	1.2774+000
2	0.0000	3.1188-003	-8.1046-003	-1.5714-002	8.4031-005	-6.4375-002	8.2965-003	1.5953-001	3.1802-002	-2.0373-001
3	0.0000	-6.5833-003	-2.6155-002	6.0730-003	9.7613-003	1.9256-002	1.8800-002	5.9000-002	-2.0758-001	9.5055-001
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	2.7868-003	8.2583-001	-6.4444-002	1.4132-002	1.1055-002	1.2685-002	3.6424-002	2.6632-001	-2.7685-001
6	1.0000+000	7.8763-006	-1.8760-006	-3.9958-003	6.7062-005	-5.6223-004	-3.2207-003	1.4860-002	5.6598-003	-3.2855-002
7	0.0000	1.0000+000	1.0000+000	-1.4410-001	7.7912-003	-5.8455-002	1.5999-002	8.4128-002	1.9283-001	-1.8345-001
8	0.0000	2.8444-004	2.5914-003	8.1583-003	5.2686-004	-2.9011-003	1.2527-002	-1.1748-001	-3.8088-001	1.1736+000
9	0.0000	2.1472-004	2.5145-003	2.2949-003	-4.7526-003	-1.2058-002	-8.8583-005	-1.0584-001	-1.1327-001	1.1182+000
10	0.0000	-2.1697-004	-2.3560-002	6.1873-003	-2.2592-003	2.6973-002	-1.1622-002	-7.5071-001	-1.4637-001	8.3687-001
11	0.0000	6.8223-005	1.0740-002	3.3431-001	-5.7528-003	1.0000+000	-1.5405-001	-1.2951+000	-5.2101-002	9.0225-001
12	0.0000	9.0555-006	1.3968-003	4.1262-002	-7.0101-004	1.1821-001	-1.8649-002	-1.3234-001	5.0573-003	4.0387-002
13	0.0000	-8.1216-004	-2.7626-002	-6.5494-002	3.2068-004	2.3985-001	-6.6506-003	-8.3488-001	-1.4582-001	7.7389-001
14	0.0000	-1.9342-002	1.3932-003	1.0000+000	-1.4243-002	9.2654-002	6.5153-001	-1.2314+000	-1.5147-001	9.9340-001
15	0.0000	-7.6987-003	5.4222-004	3.7893-001	-5.3447-003	3.4072-002	2.4349-001	-4.0924-001	-2.6318-002	1.7251-001
16	0.0000	-2.3270-003	2.5240-002	1.8643-001	-1.9003-003	-2.5557-002	5.3538-002	-2.4071+000	2.4134+000	1.6032+000
17	0.0000	5.1915-006	1.5131-004	-9.8626-004	3.1480-003	1.2851-002	4.9463-005	-5.9569-001	2.1081-001	1.5184+000
18	0.0000	-1.5255-002	-6.6162-002	-7.5660-001	1.0000+000	-2.2743-001	1.0000+000	-2.3893+000	3.5538+000	1.0576+000

T-MATRIX

	11	12	13	14	15	16	17	18
1	-2.4362-002	-1.8133-003	1.2405-001	1.9452-002	1.0000+000	6.2847-003	1.6676-001	3.1625-001
2	-1.2380-001	-2.7468-004	1.3804-001	1.0070-002	6.7854-001	6.0607-003	6.5797-002	2.0876-002
3	-1.7305+000	1.2508-002	-4.4968-002	-7.1111-002	3.8667-001	-2.5432-002	-2.6682-002	4.9698-001
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-6.5209-001
5	-1.0249+000	2.7792-002	1.2563-001	-7.5111-002	7.8828-001	2.4466-003	2.9238-002	3.5569-002
6	-1.1879-002	9.3674-005	4.1398-003	8.5513-004	-2.0822-002	6.2465-004	-2.5250-002	-4.5333-004
7	-9.7512-001	1.7596-002	7.7864-002	-7.5926-002	6.5374-001	-9.0720-003	1.9155-002	-5.4493-002
8	-3.9383-001	-4.8795-003	6.2382-002	5.2400-003	6.7691-001	6.6660-005	9.6033-002	4.3401-001
9	-6.8294-001	8.0286-002	4.8733-002	1.5452-002	5.9279-001	-1.0068-001	7.9517-002	5.0684-001
10	-5.7185-001	6.8239-003	1.3467-001	-1.1774-001	9.8503-001	-4.7778-002	1.1557-001	5.6905-001
11	1.2802-001	-4.5536-003	3.1613-002	-7.5820-002	2.7211-001	-5.8632-002	7.0782-002	1.5371-002
12	-1.2235-002	-4.5760-004	1.0000+000	-7.9252-003	-4.3796-002	-6.2300-003	-2.3564-002	1.1007-003
13	1.9007-001	-3.5467-003	2.2608-002	-3.8404-002	1.9762-001	-3.1447-002	6.4124-002	-3.1375-002
14	1.5694-001	-7.2940-003	-6.4378-003	-7.4864-002	2.6463-001	-5.8167-002	7.4835-002	1.9134-002
15	-3.8275-002	-2.3997-003	-7.9863-003	-2.5166-002	-4.0095-001	-1.9801-002	1.0000+000	4.5396-003
16	-1.3354-001	-9.2831-002	-3.7189-002	8.8081-001	2.0715-001	3.0863-001	4.7360-002	2.1830-001
17	-1.1945+000	1.0000+000	5.1150-002	-3.6388-001	6.8234-001	1.0000+000	8.5465-002	1.0000+000
18	-9.0006-001	2.3723-001	-2.3392-002	1.0000+000	2.4368-001	8.1743-001	-4.0295-003	3.1946-001

T INVERSE

	1	2	3	4	5	6	7	8	9	10
1	1.6709-002	4.7575-004	-1.2476-002	1.1595-002	4.2652-004	1.0000+000	1.4313-004	9.3493-003	5.4144-004	8.6386-003
2	-3.2473-002	4.5358-001	1.6725-001	-4.0742-002	-1.2112+000	0.0000	1.0031+000	-2.2798-001	-7.1603-003	1.1587-001
3	-2.8406-001	-1.5063+000	-8.9396-001	4.5707-002	1.1449+000	0.0000	-7.3153-003	1.3380+000	8.5881-002	-1.1026-001
4	-6.4609-001	-2.5672+000	-1.5149+000	2.3359+000	-2.1601-001	0.0000	-5.7058-003	1.9679+000	2.0174-001	2.4453+000
5	-1.9543+000	-8.3005+000	-4.6849+000	6.4475+000	-3.7325-001	0.0000	-3.0976-002	6.0385+000	9.0479-001	7.3550+000
6	6.2050-001	2.8213+000	1.4532+000	-2.2326+000	9.4522-002	0.0000	8.4440-003	-1.3176+000	-2.3298-001	-2.9228+000
7	1.2565+000	5.2491+000	2.8751+000	-4.4073+000	2.7139-001	0.0000	3.8686-002	-3.3255+000	-4.0543-001	-5.1403+000
8	9.4710-001	2.0329-001	4.0133-001	-4.1669-001	1.1900-002	0.0000	8.9850-003	-6.0317-001	-3.0009-002	-8.3232-001
9	1.8684+000	-6.0944-001	6.1103-001	-4.4522-001	6.3575-002	0.0000	2.1659-002	-2.8964+000	-8.2986-002	2.1464-001
10	7.9144-001	-9.9866-001	1.1107-001	2.6521-001	6.8157-003	0.0000	9.9067-003	-2.2723-001	-1.4419-002	-9.0466-003
11	4.1592-001	-3.3296-001	-5.5044-001	-2.4822-001	-5.1103-003	0.0000	8.6493-004	-8.0729-002	1.2284-002	4.3285-002
12	-2.7198+000	1.6506+000	-2.2276+000	1.1906+000	-1.2988-001	0.0000	-4.0753-002	-3.7748-001	5.8843+000	-1.0716+000
13	3.8934-002	2.5496-002	-3.0331-002	2.7561-002	1.4101-003	0.0000	4.2291-005	2.1730-002	1.4301-003	2.0305-002
14	-4.3272+000	4.0800+000	-1.2604+000	-3.3321-002	-1.8697-001	0.0000	-5.7416-002	5.3778+000	2.4987+000	-3.0494+000
15	6.5006-002	1.1166+000	-1.0812-001	8.7944-002	1.6694-002	0.0000	-3.7228-003	5.6599-002	6.0095-003	6.8991-002
16	5.4943-001	3.9664-001	1.1329+000	-5.8124-001	2.6501-002	0.0000	9.1756-003	2.7889+000	-4.9431+000	-5.5067-001
17	1.4519-001	3.4758-001	-1.1694-001	9.3628-002	7.9958-003	0.0000	-2.6641-004	6.4290-002	4.9791-003	7.0716-002
18	0.0000	0.0000	0.0000	-1.5335+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

T INVERSE

	11	12	13	14	15	16	17	18
1	-5.2686-004	-8.6920-003	6.7425-003	-1.8328-003	1.9722-002	-7.8115-004	-2.7327-005	1.1787-004
2	1.4893-001	2.2603-002	-2.3490-001	9.1824-003	8.4149-003	7.2416-003	1.1111-002	9.1068-003
3	2.0930-002	-2.8214-003	-4.3747-001	-3.6562-003	-5.1013-003	6.3280-003	-2.0220-002	-7.3311-003
4	1.0908+000	2.4080-002	-5.3874+000	2.0251-001	8.2186-003	4.3767-002	-1.7025-002	3.5151-002
5	2.5620+000	3.8799-003	-1.1926+001	-8.9395-001	6.8717-004	-1.1165+000	-4.2582-001	1.0763+000
6	5.1328-001	-1.2233-002	2.8913+000	1.0703-001	1.6092-003	-8.7025-002	2.3217-002	-2.0028-002
7	-1.5458+000	8.3197-003	7.5955+000	1.1900+000	-4.9062-003	-1.2928-001	3.7059-002	-4.0203-002
8	1.5411-002	1.8455-002	-1.4465-002	4.3407-002	-3.0973-003	-8.6843-002	-4.8721-003	-6.0822-003
9	-1.3153-001	2.9609-002	1.8731-001	1.0442-001	-1.0636-002	7.9857-002	-5.8382-003	-6.0634-003
10	-8.1898-002	6.1701-002	4.5049-003	4.4884-002	-3.6255-002	3.2763-003	1.5121-004	-1.7583-003
11	-1.6810-002	-3.2882-002	1.6163-002	5.4050-002	-6.2612-002	-4.8498-002	3.9078-004	5.5473-003
12	3.0227-001	-1.3250-001	-8.8436-002	-4.5055-002	-6.7713-002	-2.2087-001	5.2884-001	5.0278-002
13	-1.1941-001	9.8941-001	1.6108-002	-4.5551-003	1.7594-002	-1.8272-003	1.5421-006	3.1068-004
14	4.5943-001	-9.6293-002	1.4561-001	-3.2622-001	2.6360-002	5.3497-001	-9.3153-002	2.0019-002
15	8.3164-002	-1.8641-001	4.2111-002	4.8937-002	-1.1787-001	-6.2073-003	3.4665-004	1.2453-003
16	-5.9789-002	5.3069-002	6.6817-002	-7.5039-002	5.5862-002	2.9373-001	4.3662-001	-4.0101-002
17	2.0212-002	-8.2639-002	4.8836-002	-3.5023-001	9.5489-001	-7.6710-003	8.3055-006	1.1773-003
18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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**** THE MATRICES IN FINAL FORM ****

CASE 2

F-MATRIX

	SNFAN	SNCOM	PT3	PT45	PT7M	TT25H	TT25C	TT3	TT4PHI	TT4PLO
SNFAN	-3.5130+000	8.3663-001	-2.1093+000	1.1434-001	2.9951+000	-5.7839-001	-1.3721-001	-6.6934-002	2.2310-001	6.1357-002
SNCOM	-8.5404-001	-3.3880+000	-1.8599-001	2.5512+000	-1.0859+000	9.3035-001	2.2299-002	-5.4282-002	1.7323+000	3.2938-001
PT3	4.5569+000	-3.9915+000	-7.9970+000	6.2641-001	3.6730+000	2.8871+000	-7.3933-001	-5.0486-001	3.3246-001	-1.3040-001
PT45	1.2334+002	2.1242+002	3.5035+001	-1.6150+002	-1.0255+001	-1.7361+002	7.5943+000	8.2343+000	-1.0027+001	-9.9423+000
PT7M	1.0925+002	1.9284+001	5.8563+001	4.7368+002	-5.1340+002	-3.8874+001	2.7413+001	-6.5582+000	-5.0897+001	1.3114+001
TT25H	7.3333+000	-1.8446+000	1.4488+000	2.8460-001	8.6240-002	-1.8390+001	6.3241-001	8.9124-002	8.7680-002	8.9102-002
TT25C	2.8605+000	-3.5878+000	2.8437+000	5.5608-001	1.6710-001	3.2301+000	-1.8790+001	1.8295-001	1.8006-001	1.7863-001
TT3	-4.7715+000	2.6207+000	-1.6867+000	5.1868+000	-9.7970-002	1.7974+001	-7.2567-001	-2.0110+001	-1.0637-001	-1.1019-001
TT4PHI	-1.2802-001	-4.2648-002	-4.5038-002	2.1334-002	0.0000	1.5410-001	-1.7779-002	3.8720+000	-5.0000+001	1.1856-003
TT4PLO	-1.7068-002	-5.6886-003	-5.9739-003	2.8444-003	0.0000	2.0622-002	-2.4179-003	5.1630-001	-6.0003+000	-6.6650-001
TT4	-2.2494+001	-3.4410+001	-7.9558+000	2.8483+000	-4.6705-001	2.6769+001	-3.4213+000	2.0264+001	-4.9878-001	-5.1605-001
TT45HI	-1.5768-001	-2.4639+000	-1.4333-002	-1.1136+001	1.0812+001	3.0580-001	2.0705-002	7.8623+000	-1.3585+001	-1.4524+000
TT45LO	-6.3065-002	-9.8578-001	-5.7336-003	-4.4541+000	4.3248+000	1.2269-001	8.6007-003	3.1451+000	-5.4334+000	-5.8074-001
TT5	-7.7399-001	-1.5276+000	4.1679+000	-5.3814+000	1.1154+000	4.4728-001	-9.4886-003	3.8512+000	-6.6110+000	-6.9803-001
TT6C	-9.6033-002	3.3108-001	1.0461-001	-2.1499-002	8.5993-003	-2.4799-001	1.9829+001	1.8058-001	8.5978-003	8.5992-003
TT7M	-1.7964+001	1.4295+001	4.8698+000	4.5135-001	9.1457+000	-9.6317+000	2.7374+000	3.1510-001	1.9380+000	9.5412-001

F-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	-7.7567-001	1.2811+000	1.8349-001	-5.4105-002	2.5099-002	4.0712-002
SNCOM	-4.0238-001	1.5444-001	1.5486-001	1.5486-001	1.4433-001	1.5358-001
PT3	-2.4909+000	-1.9737-001	-1.7596-001	2.2210+000	7.5838-001	-1.9332-001
PT45	2.9748+001	-9.9203+000	-1.0070+001	-9.7797+000	-8.3987+000	-9.9455+000
PT7M	1.8568+002	2.1174+001	2.0462+001	2.2280+001	2.1488+001	2.0456+001
TT25H	9.6287-002	8.9127-002	8.6243-002	9.6295-002	1.3509-001	8.9112-002
TT25C	1.9303-001	1.7862-001	1.6958-001	1.9303-001	2.7368-001	1.7858-001
TT3	-1.1326-001	-1.1020-001	-1.0407-001	-1.1326-001	-1.6301-001	-1.1020-001
TT4PHI	4.6028+001	1.1856-003	1.1850-003	-1.1851-003	-5.9276-003	1.1850-003
TT4PLO	6.1370+000	1.4220-004	1.4222-004	-1.4223-004	-7.1121-004	1.4222-004
TT4	-4.8430+001	-5.1607-001	-4.9571-001	-5.4466-001	-7.6999-001	-5.1902-001
TT45HI	6.0973+001	-4.9900+001	6.8478-002	3.8221-002	3.9815-002	6.8481-002
TT45LO	2.4381+001	-1.7973+001	-1.9720+000	1.5482-002	1.6053-002	2.7519-002
TT5	2.0749+001	-3.1712+000	-3.1583-001	-1.9740+001	3.1173-002	4.8792-002
TT6C	5.7335-002	2.5992-003	8.5997-003	1.1465-002	-1.9990+001	8.5987-003
TT7M	-4.1842+000	8.0486-001	8.4680-001	3.6546+001	1.5770+001	-4.9150+001

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G-MATRIX

	WFMAH	ANMIX	CIVV	RCVV	BLC
SNFAN	-1.7325-001	-1.3621-002	1.9766-001	-3.7106-004	1.6742-001
SNCFM	-7.5031-001	6.7604-002	2.4514-002	9.0799-003	1.1554+000
PT3	8.8867-001	-7.1709+000	-3.6479-001	5.6819-003	-5.3668-001
PT45	5.4709+001	-3.7008+000	-4.9251+000	1.1991-001	-2.2071+002
PT7M	-9.7961+001	1.1697+001	-5.9899+000	-3.7683-001	1.4866+002
TT25H	-5.2027-001	1.2026-001	-1.2641-001	-1.4740-003	5.1240-001
TT25C	-9.2902-001	3.0630-001	-2.8807-001	-3.2312-003	1.1900+000
TT3	2.0713-001	-1.1522-001	2.4346-001	-5.3060-002	1.6845-001
TT4FHI	1.3725-001	-9.7560-004	6.5071-003	9.1588-005	-2.4201+000
TT4FLO	1.8305-002	-1.2404-004	8.7607-004	1.2105-005	-3.2238-001
TT4	2.3105+001	-5.6250-001	1.1633+000	1.7987-002	2.4907+001
TT45HI	2.6370-001	3.4827-002	2.6951-003	-1.0418-003	-3.5068+000
TT45LO	1.0501-001	1.3900-002	8.1016-004	-4.1481-004	-1.4026+000
TT5	3.0600-002	7.7657-002	-9.4339-003	-1.9440-003	-1.2468+000
TT6C	-9.7419-002	1.7357-002	9.7102-003	-1.9059-004	4.6677-002
TT7M	-3.9450+000	1.1150+000	1.2845+000	-1.8945-002	5.0619+000

H-MATRIX

	SNFAN	SNCFM	PT3	PT45	PT7M	TT25H	TT25C	TT3	TT4FHI	TT4FLO
FNMX	7.4877-001	-5.6382-001	5.6466-001	1.4360-001	6.0635-001	4.9374-001	-6.3216-002	-2.7979-002	9.9535-002	2.8779-002
WFAN	1.5026+000	1.0624-001	-8.6347-002	-1.6562-002	-5.0105-003	-9.5586-002	-3.7026-002	-5.4661-003	-5.3311-003	-5.4830-003
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	7.9903+000	2.2705+000	-1.8513+000	-3.5535-001	-1.0688-001	-2.0503+000	-7.9359-001	-1.1725-001	-1.1419-001	-1.1808-001
SMHC	6.6147+000	3.1073+001	2.3396+000	-7.0037+000	1.3691-001	-1.6817+001	1.0059+000	1.4939-001	1.4561-001	1.5051-001

H-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	-3.3021-001	2.1031-002	2.1137-002	3.7251-001	1.6029-001	2.2027-002
WFAN	-5.7543-003	-5.5565-003	-5.2635-003	-5.7682-003	-8.2936-003	-5.4831-003
TT4	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-1.2360-001	-1.1860-001	-1.1298-001	-1.2432-001	-1.7739-001	-1.1803-001
SMHC	1.5774-001	1.5158-001	1.4424-001	1.5881-001	2.2621-001	1.5033-001

D-MATRIX

	WFMAH	ANMIX	CIVV	RCVV	BLC
FNMX	-1.0176-001	-8.5117-003	-6.4104-002	-1.2613-004	1.5062-001
WFAN	3.5320-002	-1.0394-002	-1.0162-001	1.0478-004	-3.4420-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	8.6155-001	1.2497-001	-2.0490-002	2.5673-003	-8.1643-001
SMHC	-2.0551-001	8.7311-002	-3.3856-001	1.3479-001	-7.2343-001

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-5.01201+002)+J(0.00000)	0.00000	1.00000	1	(-5.99454-003)+J(0.00000)	-.0059945	.00000
			2	(2.03144-003)+J(0.00000)	.0020314	.00000
			3	(-7.42245-003)+J(0.00000)	-.0074225	.00000
			4	(3.01834-002)+J(0.00000)	.0301834	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(-6.49233-005)+J(0.00000)	-.0000649	.00000
			7	(-2.66213-004)+J(0.00000)	-.0002662	.00000
			8	(-2.28655-004)+J(0.00000)	-.0002287	.00000
			9	(-5.43529-005)+J(0.00000)	-.0000544	.00000
			10	(-7.18530-006)+J(0.00000)	-.0000072	.00000
			11	(5.17414-004)+J(0.00000)	.0005174	.00000
			12	(-2.32686-002)+J(0.00000)	-.0232686	.00000
			13	(-9.25136-003)+J(0.00000)	-.0092514	.00000
			14	(-2.10649-003)+J(0.00000)	-.0021065	.00000
			15	(-5.54727-006)+J(0.00000)	-.0000055	.00000
			16	(-2.02473-002)+J(0.00000)	-.0202473	.00000
(-1.80984+002)+J(0.00000)	0.00000	1.00000	1	(-1.75642-002)+J(0.00000)	-.0175642	.00000
			2	(-4.34180-003)+J(0.00000)	-.0043418	.00000
			3	(-2.41264-002)+J(0.00000)	-.0241264	.00000
			4	(7.18083-001)+J(0.00000)	.7180833	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(-7.60557-004)+J(0.00000)	-.0007606	.00000
			7	(-2.72286-003)+J(0.00000)	-.0027229	.00000
			8	(-2.32309-002)+J(0.00000)	-.0232309	.00000
			9	(5.49783-003)+J(0.00000)	.0054978	.00000
			10	(7.15424-004)+J(0.00000)	.0007154	.00000
			11	(-1.40958-002)+J(0.00000)	-.0140958	.00000
			12	(-1.30188-002)+J(0.00000)	-.0130188	.00000
			13	(-5.12179-003)+J(0.00000)	-.0051218	.00000
			14	(2.06898-002)+J(0.00000)	.0206898	.00000
			15	(4.25266-004)+J(0.00000)	.0004253	.00000
			16	(-7.90093-002)+J(0.00000)	-.0790093	.00000

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(-5.63031+001)+J(0.00000)	0.00000	1.00000	1	(-1.73832-002)+J(0.00000)	-.0173832	.00000
			2	(-8.92243-003)+J(0.00000)	-.0089224	.00000
			3	(4.68384-003)+J(0.00000)	.0046838	.00000
			4	(-1.25296-001)+J(0.00000)	-.1252958	.00000
			5	(-1.49965-001)+J(0.00000)	-.1499651	.00000
			6	(1.89899-003)+J(0.00000)	.0018990	.00000
			7	(-1.90980-003)+J(0.00000)	-.0019098	.00000
			8	(1.78278-002)+J(0.00000)	.0178278	.00000
			9	(2.79501-001)+J(0.00000)	.2795012	.00000
			10	(3.43657-002)+J(0.00000)	.0343657	.00000
			11	(-3.97844-002)+J(0.00000)	-.0397844	.00000
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(3.77836-001)+J(0.00000)	.3778361	.00000
			14	(1.57719-001)+J(0.00000)	.1577191	.00000
			15	(7.76185-004)+J(0.00000)	.0007762	.00000
			16	(-9.01071-001)+J(0.00000)	-.9010711	.00000
(-4.72635+001)+J(4.81664+000)	4.75083+001	.99485	1	(-2.34108-002)+J(-8.67165-003)	.0249653	-159.67478
			2	(-4.15459-003)+J(1.55960-002)	.0161399	104.91647
			3	(1.68777-002)+J(-6.40354-003)	.0180516	-20.77720
			4	(-1.37261-001)+J(1.09877-001)	.1758220	141.32285
			5	(-6.94622-002)+J(1.15558-001)	.1348286	121.01008
			6	(5.70882-004)+J(6.08855-003)	.0061153	84.64342
			7	(-8.11410-003)+J(6.89373-003)	.0106472	139.64880
			8	(3.38498-002)+J(-2.70113-002)	.0433061	-38.58904
			9	(9.56312-002)+J(-4.28771-001)	.4393060	-77.42678
			10	(1.10353-002)+J(-5.20332-002)	.0531905	-78.02605
			11	(4.76801-002)+J(-1.32782-002)	.0494945	-15.56171
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(3.73722-001)+J(-2.79286-003)	.3737323	-.42817
			14	(6.85913-002)+J(-5.46115-002)	.0876766	-38.52635
			15	(5.52820-003)+J(-3.51302-003)	.0065500	-32.43484
			16	(-1.95981-002)+J(-7.30720-001)	.7309830	-91.53632
(-4.24820+001)+J(0.00000)	0.00000	1.00000	1	(2.49966-002)+J(0.00000)	.0249966	.00000
			2	(-4.09666-002)+J(0.00000)	-.0409666	.00000
			3	(-1.90430-003)+J(0.00000)	-.0019043	.00000
			4	(4.74662-003)+J(0.00000)	.0047466	.00000
			5	(-7.59078-002)+J(0.00000)	-.0759078	.00000
			6	(-1.13549-002)+J(0.00000)	-.0113549	.00000
			7	(-9.66930-003)+J(0.00000)	-.0096693	.00000
			8	(1.87523-002)+J(0.00000)	.0187523	.00000
			9	(1.00000+000)+J(0.00000)	1.0000000	.00000
			10	(1.19523-001)+J(0.00000)	.1195233	.00000
			11	(1.61842-001)+J(0.00000)	.1618416	.00000
			12	(-6.09920-001)+J(0.00000)	-.6099203	.00000
			13	(-2.25819-001)+J(0.00000)	-.2258185	.00000
			14	(-4.87155-003)+J(0.00000)	-.0048716	.00000
			15	(8.54122-003)+J(0.00000)	.0085412	.00000
			16	(-1.53482-001)+J(0.00000)	-.1534823	.00000

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(-2.03370+001)+J(4.17142+000)	2.07613+001	.97961	1	(6.50012-003)+J(-1.62326-002)	.0174857	-68.17708
			2	(7.93335-003)+J(-2.15936-002)	.0230048	-69.82696
			3	(-1.07160-001)+J(-1.38551-002)	.1080523	-172.63294
			4	(-1.34978-001)+J(-5.04767-002)	.1441072	-159.49606
			5	(-7.67621-002)+J(-3.25263-003)	.0768310	-177.57367
			6	(-3.58044-003)+J(-3.36328-004)	.0035962	-174.63369
			7	(3.98979-002)+J(1.22721-002)	.0417426	17.09727
			8	(-6.64427-002)+J(1.96454-001)	.2073860	108.68600
			9	(-5.91763-002)+J(3.06306-001)	.3119703	100.93445
			10	(-4.40350-003)+J(3.25901-002)	.0328863	97.69507
			11	(-6.02915-002)+J(1.75423-001)	.1854950	108.96742
			12	(-4.70096-002)+J(2.97886-001)	.3015722	98.96793
			13	(-1.16939-002)+J(1.01292-001)	.1019645	96.58552
			14	(7.94775-001)+J(1.92208-001)	.8176864	13.59537
			15	(5.37927-002)+J(-1.92977-001)	.2003344	-74.42410
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-2.20350+001)+J(0.00000)	0.00000	1.00000	1	(-1.17671-002)+J(0.00000)	-.0117671	.00000
			2	(-1.29617-002)+J(0.00000)	-.0129617	.00000
			3	(7.36794-002)+J(0.00000)	.0736794	.00000
			4	(2.99821-002)+J(0.00000)	.0299821	.00000
			5	(4.31265-002)+J(0.00000)	.0431265	.00000
			6	(-1.71495-002)+J(0.00000)	-.0171495	.00000
			7	(-1.04553-001)+J(0.00000)	-.1045529	.00000
			8	(1.33573-001)+J(0.00000)	.1335728	.00000
			9	(1.74461-001)+J(0.00000)	.1744605	.00000
			10	(1.85435-002)+J(0.00000)	.0185435	.00000
			11	(9.49034-002)+J(0.00000)	.0949034	.00000
			12	(1.64040-001)+J(0.00000)	.1640399	.00000
			13	(5.58025-002)+J(0.00000)	.0558025	.00000
			14	(-8.09392-001)+J(0.00000)	-.8093917	.00000
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(-4.77610-001)+J(0.00000)	-.4776099	.00000
(-1.91564+001)+J(0.00000)	0.00000	1.00000	1	(9.74848-003)+J(0.00000)	.0097485	.00000
			2	(1.58292-004)+J(0.00000)	.0001583	.00000
			3	(-1.19675-001)+J(0.00000)	-.1196749	.00000
			4	(-1.94242-001)+J(0.00000)	-.1942416	.00000
			5	(-1.28573-001)+J(0.00000)	-.1285735	.00000
			6	(5.42257-002)+J(0.00000)	.0542257	.00000
			7	(-1.54479-002)+J(0.00000)	-.0154479	.00000
			8	(-2.12486-002)+J(0.00000)	-.0212486	.00000
			9	(2.42335-002)+J(0.00000)	.0242335	.00000
			10	(2.47600-003)+J(0.00000)	.0024760	.00000
			11	(1.77906-002)+J(0.00000)	.0177906	.00000
			12	(4.75042-002)+J(0.00000)	.0475042	.00000
			13	(1.56650-002)+J(0.00000)	.0156650	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(-3.75058-001)+J(0.00000)	-.3750584	.00000
			16	(9.35821-001)+J(0.00000)	.9358210	.00000

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(-1.61691+001)+J(0.00000)	0.00000	1.00000	1	(1.68279-002)+J(0.00000)	.0168279	.00000
			2	(-4.23457-003)+J(0.00000)	-.0042346	.00000
			3	(-1.31124-001)+J(0.00000)	-.1311243	.00000
			4	(-3.13110-001)+J(0.00000)	-.3131098	.00000
			5	(-1.79839-001)+J(0.00000)	-.1798392	.00000
			6	(1.21652-001)+J(0.00000)	.1216523	.00000
			7	(1.93293-001)+J(0.00000)	.1932928	.00000
			8	(5.02770-002)+J(0.00000)	.0502770	.00000
			9	(8.56745-002)+J(0.00000)	.0856745	.00000
			10	(8.22805-003)+J(0.00000)	.0082281	.00000
			11	(5.85811-002)+J(0.00000)	.0585811	.00000
			12	(1.33747-001)+J(0.00000)	.1337469	.00000
			13	(4.21443-002)+J(0.00000)	.0421443	.00000
			14	(5.57393-001)+J(0.00000)	.5573931	.00000
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(9.94644-001)+J(0.00000)	.9946439	.00000
(-4.02906+000)+J(3.06256+000)	5.06089+000	.79612	1	(3.46296-001)+J(4.35176-001)	.5561466	51.48857
			2	(7.62869-003)+J(7.69597-002)	.0773369	84.33901
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(1.05241-001)+J(3.01864-001)	.3196837	70.77955
			5	(2.75941-001)+J(3.02181-001)	.4092149	47.59673
			6	(3.32009-001)+J(1.44971-001)	.3622798	23.58846
			7	(3.53403-001)+J(2.79226-002)	.3545047	4.51758
			8	(1.97605-001)+J(1.08846-001)	.2255996	28.84709
			9	(-1.00532-001)+J(-9.61219-002)	.1390903	-136.28472
			10	(-1.21971-002)+J(4.78255-003)	.0131013	158.58967
			11	(-1.09653-001)+J(-1.11181-001)	.1561572	-134.60358
			12	(-4.80601-002)+J(-1.04994-001)	.1154794	-114.60451
			13	(-3.91749-002)+J(-1.02855-002)	.0405027	-165.28881
			14	(8.76481-002)+J(-2.47204-001)	.2622823	-70.47764
			15	(4.30626-001)+J(-5.10957-002)	.4336466	-6.76676
			16	(1.83817-001)+J(-3.39533-001)	.3860982	-61.56967
(-2.70386+000)+J(0.00000)	0.00000	1.00000	1	(5.62589-001)+J(0.00000)	.5625887	.00000
			2	(4.03028-001)+J(0.00000)	.4030278	.00000
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(7.56492-001)+J(0.00000)	.7564921	.00000
			5	(8.35463-001)+J(0.00000)	.8354634	.00000
			6	(3.36992-001)+J(0.00000)	.3369923	.00000
			7	(2.87655-001)+J(0.00000)	.2876547	.00000
			8	(3.69475-001)+J(0.00000)	.3694748	.00000
			9	(-3.35838-001)+J(0.00000)	-.3358381	.00000
			10	(5.03536-002)+J(0.00000)	.0503536	.00000
			11	(-3.74588-001)+J(0.00000)	-.3745884	.00000
			12	(-3.34440-001)+J(0.00000)	-.3344397	.00000
			13	(4.32928-001)+J(0.00000)	.4329276	.00000
			14	(-3.80193-001)+J(0.00000)	-.3801928	.00000
			15	(3.37519-001)+J(0.00000)	.3375188	.00000
			16	(-2.92490-002)+J(0.00000)	-.0292490	.00000

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(-1.9[illegible]643+000)+J(0.00000)	0.00000	1.00000	1	(-1.32259-002)+J(0.00000)	-.0132259	.00000
			2	(-5.88954-002)+J(0.00000)	-.0588954	.00000
			3	(-8.51869-002)+J(0.00000)	-.0851869	.00000
			4	(-1.59547-001)+J(0.00000)	-.1595469	.00000
			5	(-1.14873-001)+J(0.00000)	-.1148726	.00000
			6	(-4.93165-003)+J(0.00000)	-.0049316	.00000
			7	(-1.27830-003)+J(0.00000)	-.0012783	.00000
			8	(-5.30242-002)+J(0.00000)	-.0530242	.00000
			9	(1.40430-002)+J(0.00000)	.0140430	.00000
			10	(-4.34831-003)+J(0.00000)	-.0043483	.00000
			11	(1.90046-002)+J(0.00000)	.0190046	.00000
			12	(2.72488-002)+J(0.00000)	.0272488	.00000
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(1.92249-002)+J(0.00000)	.0192249	.00000
			15	(-2.67914-003)+J(0.00000)	-.0026791	.00000
			16	(-1.35750-002)+J(0.00000)	-.0135750	.00000
(-7.15716-001)+J(0.00000)	0.00000	1.00000	1	(1.10563-001)+J(0.00000)	.1105628	.00000
			2	(1.16841-001)+J(0.00000)	.1168408	.00000
			3	(8.76891-002)+J(0.00000)	.0876891	.00000
			4	(1.56438-001)+J(0.00000)	.1564381	.00000
			5	(1.59261-001)+J(0.00000)	.1592606	.00000
			6	(4.72190-002)+J(0.00000)	.0472190	.00000
			7	(2.69502-002)+J(0.00000)	.0269502	.00000
			8	(6.26477-002)+J(0.00000)	.0626477	.00000
			9	(-8.59751-002)+J(0.00000)	-.0859751	.00000
			10	(1.00000+000)+J(0.00000)	1.0000000	.00000
			11	(-9.70621-002)+J(0.00000)	-.0970621	.00000
			12	(-1.22737-001)+J(0.00000)	-.1227366	.00000
			13	(-1.63394-001)+J(0.00000)	-.1633944	.00000
			14	(-1.51329-001)+J(0.00000)	-.1513293	.00000
			15	(2.94096-002)+J(0.00000)	.0294096	.00000
			16	(-5.86013-002)+J(0.00000)	-.0586013	.00000

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**** THE MATRICES IN FINAL FORM ****

CASE 3

F-MATRIX

	SKFAN	SKCOM	PT7M	PT3	PT45	TT25H	TT25C	TT3	TT4PHI	TT4PLO
SKFAN	-1.9020+000	1.9695+000	-2.9000+000	-4.8331-002	2.8070+000	-1.4876+000	-2.8541-001	-1.3587-001	6.3830-002	-4.8330-002
SKCOM	-2.0699-001	-3.2620+000	-2.1961-001	1.2476+000	-6.7542-001	1.3554+000	-7.4857-002	-1.3877-001	7.6322-001	6.2895-002
PT7M	2.9640+000	-5.9626+000	-1.5700+001	9.2597-001	4.0497+000	4.0808+000	2.2020-002	1.1846-001	7.0438-001	3.6638-001
PT3	6.5298+001	4.7466+002	4.8030+001	-1.3020+002	3.0912+000	-2.7181+002	1.5834+001	2.1457+001	4.5916+000	4.7784+000
PT45	1.8335+001	4.3463+001	2.2224+002	3.5971+002	-6.7140+002	-7.4851+001	-1.2392+001	-3.4289+001	-7.7383+001	-2.0880+001
TT25H	2.7055+000	-3.9258+000	2.5427+000	4.0411-001	1.2588-001	-1.6890+001	8.0170-001	2.2358-001	1.9379-001	2.0872-001
TT25C	2.8250+000	-7.1481+000	3.5028+000	6.1538-001	1.6723-001	4.8844+000	-1.8880+001	3.0943-001	2.8095-001	2.9254-001
TT3	-2.2320+000	-5.0001+000	-1.6330+000	4.5990+000	-7.7523+002	1.9651+001	-5.1844-001	-2.0140+001	-1.2888-001	-1.3663-001
TT4PHI	-3.0595-002	-6.7613-002	-2.5763-002	9.6641-003	-8.0511-003	1.3204-001	-9.6628-003	3.9273+000	-5.0000+001	-1.6100-003
TT4PLO	-4.0585-003	-8.8697-003	-3.4780-003	1.3523-003	-9.6620-004	1.7585-002	-1.1594-003	5.2364-001	-6.0003+000	-6.6690-001
TT4	-1.1340+001	-7.9468+001	-8.3057+000	2.7740+000	-4.0372-001	4.8633+001	-2.6389+000	2.3015+001	-6.7224-001	-7.0429-001
TT45HI	2.0734-001	-9.2059-001	1.5332-001	-1.2205+001	1.1411+001	-8.2703-001	5.6143-002	8.1086+000	-1.3612+001	-1.4991+000
TT45LO	8.2389-002	-3.2693-001	6.1414-002	-4.8840+000	4.5635+000	-3.3114-001	2.2545-002	3.2434+000	-5.4472+000	-5.9934-001
TT5	5.1036-002	-3.6509-001	3.7798+000	-5.4997+000	1.1663+000	1.4273-001	-2.3356-002	3.6548+000	-6.1746+000	-6.8770-001
TT6C	-4.1666-002	5.2505-001	8.1682-002	-1.1666-002	3.3332-003	-2.8997-001	1.9862+001	1.3666-001	8.3324-003	8.3323-003
TT7M	-1.0856+001	2.7486+001	2.2105+000	5.1713-001	1.1665+001	-1.5248+001	2.0771+000	1.9894-001	1.7702+000	8.1556-001

F-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SKFAN	-6.1362-001	7.1413-001	2.4011-002	-7.0228-002	-1.3318-001	-6.3830-002
SKCOM	-3.5594-001	-2.4953-002	-2.4464-002	-2.1464-002	-3.2447-002	-2.4459-002
PT7M	-1.2675+000	3.5502-001	3.4565-001	1.8718+000	1.0832+000	3.2974-001
PT3	4.0529+001	4.8253+000	4.8250+000	4.2167+000	6.7017+000	4.8257+000
PT45	1.3837+002	-1.4091+001	-1.3748+001	-1.1204+001	-9.3359+000	-1.3411+001
TT25H	2.3011-001	2.0865-001	2.0871-001	1.7558-001	3.0314-001	2.0868-001
TT25C	3.5777-001	3.0261-001	3.0268-001	2.4918-001	4.3649-001	3.0264-001
TT3	-1.6376-001	-1.3766-001	-1.3742-001	-1.1527-001	-2.0060-001	-1.3760-001
TT4PHI	4.6009+001	-1.6097-003	-1.6098-003	-4.8304-003	-3.2203-003	-1.6103-003
TT4PLO	6.1347+000	-1.9321-004	-1.9320-004	-5.7967-004	-3.8641-004	-1.9322-004
TT4	-4.4930+001	-7.0834-001	-7.0705-001	-5.9431-001	-1.0329+000	-7.0724-001
TT45HI	6.1114+001	-4.9970+001	6.4776-003	-2.1597-003	1.2957-002	6.4781-003
TT45LO	2.4450+001	-1.7991+001	-1.9980+000	-1.5545-003	0.0000	2.3321-003
TT5	2.7628+001	-1.9640+000	-2.2568-001	-1.9970+001	5.4502-002	-1.7299-003
TT6C	3.8319-002	1.1666-002	8.3333-003	1.1667-002	-1.9990+001	8.3326-003
TT7M	-4.0610+000	7.0470-001	6.9615-001	3.3217+001	1.8619+001	-4.9310+001

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G-MATRIX

	WFMBH	ANMTX	CIVV	RCVV	BLC
SNFAN	3.4494-001	-1.0504-002	4.5263-002	-2.7537-002	-3.6487-001
SNCOM	-6.1680-003	-2.9429-002	8.8433-003	1.1030-001	2.2567-001
PT7M	-1.4156+000	-4.5964+000	-1.3231-001	1.1578-001	1.9298+000
PT3	-1.5614+001	1.9049+000	-2.0750+000	-1.0518+001	-1.1464+002
PT45	5.7696+001	-5.5714+000	-1.3877-001	-1.4543+000	-4.1189+001
TT25H	-1.0889+000	3.7419-002	-5.5837-003	4.5063-002	1.2941+000
TT25C	-1.4520+000	1.0574-001	-5.0423-002	1.2566-001	1.4401+000
TT3	1.2154+000	1.0048-001	7.5549-002	-2.0616-001	-2.1698+000
TT4PHI	9.4953-002	-3.7603-003	1.0577-003	4.8438-003	-2.2459+000
TT4PLO	1.2455-002	-5.1274-004	1.3684-004	6.1887-004	-2.9869-001
TT4	2.2116+001	-3.4215-001	3.5096-001	1.7356+000	2.2263+001
TT45HI	2.6669-001	-2.8201-003	-6.3981-003	-4.9062-002	-3.6797+000
TT45LO	1.0815-001	-1.0121-003	-2.5389-003	-1.9535-002	-1.4732+000
TT5	1.2570-001	-1.7204-002	-1.1629-002	-2.5134-002	-1.4853+000
TT6C	-4.0251-002	-2.1607-003	2.1064-003	-1.2361-002	5.9806-002
TT7M	-2.6230+000	3.1484-001	4.2505-001	-6.6461-001	4.0382+000

H-MATRIX

	SNFAN	SNCOM	PT7M	PT3	PT45	TT25H	TT25C	TT3	TT4PHI	TT4PLC
FNMX	5.7070-001	-1.3988+000	2.0693+000	1.2084-001	8.[illegible]03-001	8.1175-001	-8.1101-002	-6.3457-002	6.8862-002	1.3063-003
WFAN	9.5875-001	2.7187-001	-1.6636-001	-2.6624-002	-7.[illegible]4-003	-2.0298-001	-5.2779-002	-1.4408-002	-1.3370-002	-1.4013-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	2.2106+000	1.0059+001	-5.7984+000	-9.2732-001	-2.7900-001	-7.0718+000	-1.8394+000	-5.0410-001	-4.6751-001	-4.8816-001
SMHC	2.5814+000	3.1900+001	1.8904+000	-5.1382+000	9.1172-002	-1.6189+001	6.0066-001	1.6545-001	1.5240-001	1.5964-001

H-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	-3.5751-001	-1.2618-002	-1.1499-002	3.0644-001	1.4627-001	-8.7263-003
WFAN	-1.6767-002	-1.0044-002	-1.0043-002	-1.1782-002	-2.0591-002	-1.4040-002
TT4	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-5.8490-001	-4.9140-001	-4.8984-001	-4.1068-001	-7.1667-001	-4.8985-001
SMHC	1.9119-001	1.6055-001	1.5996-001	1.3503-001	2.3506-001	1.5995-001

D-MATRIX

	WFMPH	ANMTX	CIVV	RCVV	BLC
FNMX	5.1741-002	-8.3787-002	-2.3274-002	3.3847-002	-5.6173-002
WFAN	6.7214-002	-3.2868-003	-3.5785-002	-3.7877-003	-7.9740-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	2.4943+000	1.1227-001	7.6716-001	-5.0342-001	3.7231+000
SMHC	-3.5243-001	1.1092-001	-7.8432-002	9.9091-001	3.3595-001

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-6.73942+002)+J(0.00000)	0.00000	1.00000	1	(-4.18827-003)+J(0.00000)	-.0041883	.00000
			2	(1.01187-003)+J(0.00000)	.0010119	.00000
			3	(-6.08639-003)+J(0.00000)	-.0060864	.00000
			4	(-5.22647-003)+J(0.00000)	-.0052265	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(-1.26965-004)+J(0.00000)	-.0001270	.00000
			7	(-1.66917-004)+J(0.00000)	-.0001669	.00000
			8	(1.27710-004)+J(0.00000)	.0001277	.00000
			9	(-3.20189-005)+J(0.00000)	-.0000320	.00000
			10	(-4.39956-006)+J(0.00000)	-.0000044	.00000
			11	(5.93273-004)+J(0.00000)	.0005933	.00000
			12	(-1.84455-002)+J(0.00000)	-.0184455	.00000
			13	(-7.34423-003)+J(0.00000)	-.0073442	.00000
			14	(-1.87451-003)+J(0.00000)	-.0018745	.00000
			15	(1.36536-007)+J(0.00000)	.0000001	.00000
			16	(-1.86358-002)+J(0.00000)	-.0186358	.00000
(-1.34530+002)+J(0.00000)	0.00000	1.00000	1	(-1.46473-002)+J(0.00000)	-.0146473	.00000
			2	(-6.42525-003)+J(0.00000)	-.0064253	.00000
			3	(-3.09485-002)+J(0.00000)	-.0309485	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(6.48654-001)+J(0.00000)	.6486544	.00000
			6	(-3.27685-003)+J(0.00000)	-.0032769	.00000
			7	(-5.18832-003)+J(0.00000)	-.0051883	.00000
			8	(-4.01960-002)+J(0.00000)	-.0401960	.00000
			9	(1.66237-002)+J(0.00000)	.0166237	.00000
			10	(2.14360-003)+J(0.00000)	.0021436	.00000
			11	(-2.72332-002)+J(0.00000)	-.0272332	.00000
			12	(8.30535-002)+J(0.00000)	.0830535	.00000
			13	(3.24923-002)+J(0.00000)	.0324923	.00000
			14	(5.26262-002)+J(0.00000)	.0526262	.00000
			15	(1.06855-003)+J(0.00000)	.0010685	.00000
			16	(-1.17559-001)+J(0.00000)	-.1175593	.00000

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(-5.06687+001)+J(7.16237+000)	5.11724+001	.99016	1	(-1.50424-002)+J(-4.64373-003)	.0157428	-162.84399
			2	(-4.78816-003)+J(5.44683-003)	.0072522	131.31778
			3	(-1.87936-002)+J(9.06288-003)	.0208647	154.25517
			4	(6.30317-002)+J(-2.36447-002)	.0673911	-20.72146
			5	(-6.31935-003)+J(4.97111-002)	.0501112	97.24467
			6	(-7.05716-003)+J(4.33576-003)	.0082827	148.43434
			7	(-1.10595-002)+J(6.22203-003)	.0126896	150.63803
			8	(-1.82507-003)+J(-2.40997-003)	.0030231	-127.13658
			9	(1.89601-001)+J(-3.07724-001)	.3614452	-58.36119
			10	(2.26349-002)+J(-3.78549-002)	.0441059	-59.12311
			11	(4.53237-002)+J(3.41775-002)	.0567657	37.01906
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(3.75939-001)+J(-3.56270-003)	.3759560	-.54296
			14	(9.67034-002)+J(-7.78355-002)	.1241367	-38.83020
			15	(7.24356-003)+J(-2.19459-003)	.0075687	-16.85531
			16	(-4.67103-001)+J(-5.42017-001)	.7155195	-130.75434
(-5.32544+001)+J(0.00000)	0.00000	1.00000	1	(1.25624-002)+J(0.00000)	.0125624	.00000
			2	(2.57302-003)+J(0.00000)	.0025730	.00000
			3	(6.32466-003)+J(0.00000)	.0063247	.00000
			4	(2.84700-003)+J(0.00000)	.0028470	.00000
			5	(3.33244-002)+J(0.00000)	.0333244	.00000
			6	(1.33078-003)+J(0.00000)	.0013308	.00000
			7	(2.47430-003)+J(0.00000)	.0024743	.00000
			8	(-1.42553-003)+J(0.00000)	-.0014255	.00000
			9	(-1.43994-001)+J(0.00000)	-.1439944	.00000
			10	(-1.76180-002)+J(0.00000)	-.0176180	.00000
			11	(1.03059-002)+J(0.00000)	.0103059	.00000
			12	(-8.99778-001)+J(0.00000)	-.8997784	.00000
			13	(-3.38903-001)+J(0.00000)	-.3389034	.00000
			14	(-9.21931-002)+J(0.00000)	-.0921931	.00000
			15	(-1.29177-003)+J(0.00000)	-.0012918	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.24895+001)+J(0.00000)	0.00000	1.00000	1	(1.73248-002)+J(0.00000)	.0173248	.00000
			2	(-1.98840-002)+J(0.00000)	-.0198840	.00000
			3	(-6.69130-003)+J(0.00000)	-.0066913	.00000
			4	(1.13620-002)+J(0.00000)	.0113620	.00000
			5	(-6.90678-002)+J(0.00000)	-.0690678	.00000
			6	(-7.39708-003)+J(0.00000)	-.0073971	.00000
			7	(-1.10773-002)+J(0.00000)	-.0110773	.00000
			8	(3.25924-003)+J(0.00000)	.0032592	.00000
			9	(1.00000+000)+J(0.00000)	1.0000000	.00000
			10	(1.19526-001)+J(0.00000)	.1195261	.00000
			11	(1.62921-001)+J(0.00000)	.1629214	.00000
			12	(-6.29899-001)+J(0.00000)	-.6298988	.00000
			13	(-2.33302-001)+J(0.00000)	-.2333024	.00000
			14	(2.68289-002)+J(0.00000)	.0268289	.00000
			15	(9.89535-003)+J(0.00000)	.0098953	.00000
			16	(3.17220-002)+J(0.00000)	.0317220	.00000

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(-1.93791+001)+J(4.00175+000)	1.97880+001	.97934	1	(-2.06813-002)+J(-1.14067-002)	.0236184	-151.12119
			2	(-1.06188-002)+J(-1.31880-002)	.0169317	-128.84035
			3	(-2.32050-001)+J(-2.31765-001)	.3279665	-135.03526
			4	(1.06856-001)+J(-1.40689-001)	.1766678	-52.78266
			5	(-6.62463-002)+J(-1.73837-001)	.1860315	-110.86103
			6	(-4.78148-002)+J(4.61337-002)	.0664423	136.02517
			7	(-4.64800-002)+J(5.50060-002)	.0720142	130.19773
			8	(1.15491-001)+J(9.19752-002)	.1476401	38.53325
			9	(1.99404-001)+J(2.82462-001)	.3457554	54.77989
			10	(2.24805-002)+J(2.80644-002)	.0359581	51.30415
			11	(9.83586-002)+J(1.97243-001)	.2204071	63.49610
			12	(1.05313-001)+J(2.66968-001)	.2869889	68.47194
			13	(3.93676-002)+J(8.78081-002)	.0962292	65.85154
			14	(7.88730-001)+J(7.93905-002)	.7927157	5.74781
			15	(2.30979-001)+J(2.58650-001)	.3467723	48.23462
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.88568+000)+J(2.43750-001)	4.89175+000	.99876	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-3.61827-002)+J(2.21191-003)	.0362502	176.50177
			3	(7.75351-001)+J(-5.53170-002)	.7773216	-4.08052
			4	(-5.43556-002)+J(2.11106-002)	.0583111	158.77481
			5	(1.44719-001)+J(2.31851-003)	.1447372	.91785
			6	(5.16146-001)+J(-3.35027-002)	.5172317	-3.71382
			7	(6.79557-001)+J(-4.75742-002)	.6812199	-4.00461
			8	(3.73774-001)+J(-3.20467-002)	.3751454	-4.90045
			9	(3.67636-001)+J(-4.42905-002)	.3702944	-6.86953
			10	(-1.53769-003)+J(-2.75939-003)	.0031589	-119.12909
			11	(3.28732-001)+J(-3.87116-002)	.3310038	-6.71624
			12	(4.52524-001)+J(-5.20560-002)	.4555088	-6.56216
			13	(-5.39918-003)+J(-1.51029-002)	.0160389	-109.67165
			14	(7.19731-001)+J(-8.70554-002)	.7249770	-6.89673
			15	(8.88336-001)+J(-7.70701-002)	.8916727	-4.95844
			16	(5.67107-001)+J(-9.12433-002)	.5744001	-9.14013
(-1.99174+000)+J(0.00000)	0.00000	1.00000	1	(-1.84233-001)+J(0.00000)	-.1842327	.00000
			2	(-8.86186-003)+J(0.00000)	-.0088619	.00000
			3	(-4.37025-002)+J(0.00000)	-.0437025	.00000
			4	(-5.04520-002)+J(0.00000)	-.0504520	.00000
			5	(-6.18576-002)+J(0.00000)	-.0618576	.00000
			6	(-2.81954-002)+J(0.00000)	-.0281954	.00000
			7	(-2.90119-002)+J(0.00000)	-.0290119	.00000
			8	(-2.08455-002)+J(0.00000)	-.0208455	.00000
			9	(9.83811-003)+J(0.00000)	.0098381	.00000
			10	(-2.98081-003)+J(0.00000)	-.0029808	.00000
			11	(1.19934-002)+J(0.00000)	.0119934	.00000
			12	(6.97674-003)+J(0.00000)	.0069767	.00000
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(-5.89812-004)+J(0.00000)	-.0005898	.00000
			15	(-3.12201-002)+J(0.00000)	-.0312201	.00000
			16	(2.84090-002)+J(0.00000)	.0284090	.00000

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**** THE MATRICES IN FINAL FORM ****

CASE 4

F-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
SNFAN	-1.9017+000	1.9701+000	-2.8997+000	3.4404-001	-4.8429-002	0.0000	2.8070+000	-1.4888+000	-2.8533-001	-1.7382-001
SNCOM	-2.9737-001	-3.2628+000	-2.1994-001	-4.9933-003	1.2477+000	0.0000	-6.7551-001	1.3571+000	-7.4966-002	-8.9381-002
PT7M	2.9818+000	-5.9675+000	-1.5702+001	-1.4087+000	9.2671-001	0.0000	4.0492+000	4.0905+000	2.1383-002	4.0613-001
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	6.5269+001	4.7460+002	4.8005+001	-1.5724+001	-1.3019+002	0.0000	3.0842+000	-2.7168+002	1.5826+001	2.5209+001
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5000-001	0.0000	0.0000	0.0000	0.0000
PT45	1.8462+001	4.3741+001	2.2235+002	5.7306+001	3.5967+002	0.0000	-6.7137+002	-7.5402+001	-1.2356+001	-5.0683+001
TT25H	2.7042+000	-3.9286+000	2.5417+000	-1.0850+000	4.0454-001	0.0000	1.2556-001	-1.6884+001	8.0134-001	3.8747-001
TT25C	2.8232+000	-7.1520+000	3.5013+000	-1.4465+000	6.1597-001	0.0000	1.6681-001	4.8922+000	-1.8881+001	5.3913-001
TT3	-2.2312+000	-4.9983+000	-1.6331+000	1.2128+000	4.5987+000	0.0000	-7.7325-002	1.9647+001	-5.1820-001	-2.0247+001
TT4PHI	-3.0585-002	-6.7591-002	-2.5754-002	9.4923-002	9.6609-003	0.0000	-8.0488-003	1.3200-001	-9.6600-003	3.9261+000
TT4	-1.1335+001	-7.9459+001	-8.3020+000	2.2103+001	2.7726+000	0.0000	-4.0270-001	4.8614+001	-2.6377+000	2.2462+001
TT45HI	2.1646-001	-8.0061-001	1.6114-001	2.3870-001	-1.2208+001	0.0000	1.1413+001	-8.6656-001	5.8750-002	6.9316+000
TT45LO	8.6037-002	-3.2086-001	6.4540-002	9.6954-002	-4.8853+000	0.0000	4.5644+000	-3.4695-001	2.3587-002	2.7728+000
TT5	5.5221-002	-8.5592-001	3.7834+000	1.1286-001	-5.5011+000	0.0000	1.1673+000	1.2460-001	-2.2160-002	3.1148+000
TT6C	-4.1719-002	5.2494-001	8.1638-002	-4.4096-002	-1.1649-002	0.0000	3.3211-003	-2.8975-001	1.9862+001	1.4320-001
TT7M	-1.0861+001	2.7475+001	2.2062+000	-2.8077+000	5.1879-001	0.0000	1.1663+001	-1.5226+001	2.0757+000	8.3930-001

F-MATRIX

	TT4PHI	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	4.9867-001	-1.0582+000	7.1414-001	2.4625-002	-7.0186-002	-1.3315-001	-6.3816-002
SNCOM	1.9733-001	2.2262-001	-2.4971-002	-2.4482-002	-2.1519-002	-3.2484-002	-2.4478-002
PT7M	-2.5920+000	2.1027+000	3.5582-001	3.4554-001	1.8715+000	1.0830+000	3.2963-001
WFCOM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	-3.8401+001	8.4485+001	4.8239+000	4.8236+000	4.2126+000	6.6990+000	4.8244+000
FTIT	0.0000	0.0000	1.3004-001	1.4449-002	0.0000	0.0000	0.0000
PT45	1.1048+002	-5.3704+001	-1.4085+001	-1.3742+001	-1.1186+001	-9.3238+000	-1.3405+001
TT25H	-1.6841+000	2.1701+000	2.0859-001	2.0865-001	1.7540-001	3.0301-001	2.0862-001
TT25C	-2.3512+000	3.0486+000	3.0253-001	3.0260-001	2.4893-001	4.3632-001	3.0255-001
TT3	1.1004+000	-1.4206+000	-1.3762-001	-1.3758-001	-1.1515-001	-2.0052-001	-1.3756-001
TT4PHI	-4.9996+001	4.5994+001	-1.6094-003	-1.6093-003	-4.8290-003	-3.2193-003	-1.6099-003
TT4	5.6644+000	-5.5409+001	-7.0814-001	-7.0685-001	-5.9370-001	-1.0324+000	-7.0704-001
TT45HI	-1.2475-001	4.7324+001	-4.9970+001	6.9121-003	-8.5671-004	1.3825-002	6.9125-003
TT45LO	-5.4726-002	1.8937+001	-1.7991+001	-1.9978+000	-1.0337-003	3.4726-004	2.5058-003
TT5	1.2919-002	2.1302+001	-1.9638+000	-2.2648-001	-1.9969+001	5.4900-002	-1.5306-003
TT6C	-6.6636-002	1.1497-001	1.1663-002	8.3309-003	1.1660-002	-1.9990+001	8.3301-003
TT7M	-5.5677+000	3.4412+000	7.0446-001	6.9591-001	3.3216+001	1.8619+001	-4.9310+001

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G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	0.0000	-1.0466-002	4.5253-002	-2.7581-002	-3.4322-001
SNCOM	0.0000	-2.9477-002	8.8563-003	1.1036-001	1.9750-001
PT7M	0.0000	-4.5967+000	-1.3224-001	1.1612-001	1.7657+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	0.0000	1.9013+000	-2.0740+000	-1.0513+001	-1.1678+002
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT45	0.0000	-5.5554+000	-1.4306-001	-1.4737+000	-3.1537+001
TT25H	0.0000	3.7259-002	-5.5408-003	4.5256-002	1.2006+000
TT25C	0.0000	1.0851-001	-5.0363-002	1.2593-001	1.3091+000
TT3	0.0000	1.0059-001	7.5521-002	-2.0628-001	-2.1086+000
TT4PHI	0.0000	-3.7791-003	1.0573-003	4.8423-003	-2.2452+000
TT4	0.0000	-3.4161-001	3.5082-001	1.7349+000	2.2579+001
TT45HI	0.0000	-1.6675-003	-6.7056-003	-5.0453-002	-3.0083+000
TT45LO	0.0000	-5.5133-004	-2.6619-003	-2.0091-002	-1.2048+000
TT5	0.0000	-1.6676-002	-1.1770-002	-2.5772-002	-1.1773+000
TT6C	0.0000	-2.1671-003	2.1081-003	-1.2354-002	5.6074-002
TT7M	0.0000	3.1421-001	4.2609-001	-6.6365-001	3.6729+000

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
FNMX	5.7069-001	-1.3988+000	2.0893+000	5.1766-002	1.2085-001	0.0000	8.0503-001	8.1179-001	-8.1103-002	-6.2431-002
WFAN	9.5883-001	2.7205-001	-1.6631-001	6.6952-002	-2.6652-002	0.0000	-7.9651-003	-2.0335-001	-5.2755-002	-2.5410-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	2.2136+000	1.0065+001	-5.7959+000	2.4851+000	-9.2831-001	0.0000	-2.7830-001	-7.0846+000	-1.8386+000	-8.8740-001
SMHC	2.5805+000	3.1898+001	1.8896+000	-3.4945-001	-5.1379+000	0.0000	9.0941-002	-1.6184+001	6.0038-001	2.9080-001

H-MATRI)

	TT4PHI	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	5.7106-002	-3.4549-001	-1.2618-002	-1.1500-002	3.0644-001	1.4627-001	-8.7267-003
WFAN	1.1271-001	-1.4567-001	-1.4040-002	-1.4039-002	-1.1770-002	-2.0582-002	-1.4036-002
TT4	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	3.9246+000	-5.0754+000	-4.9126-001	-4.8970-001	-4.1025-001	-7.1638-001	-4.8971-001
SMHC	-1.2840+000	1.6597+000	1.6050-001	1.5991-001	1.3489-001	2.3497-001	1.5991-001

D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	0.0000	-8.3788-002	-2.3274-002	3.3846-002	-5.6758-002
WFAN	0.0000	-3.2761-003	-3.5788-002	-3.8007-003	-7.3464-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	1.1264-001	7.6706-001	-5.0387-001	3.9417+000
SMHC	0.0000	1.1079-001	-7.8399-002	9.9106-001	2.6445-001

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(0.00000)+J(0.00000)	.0000000	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
(-6.74050+002)+J(0.00000)	0.00000	1.00000	1	(-4.18730-003)+J(0.00000)	-.0041873	.00000
			2	(1.01136-003)+J(0.00000)	.0010114	.00000
			3	(-6.08785-003)+J(0.00000)	-.0060879	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-5.26574-003)+J(0.00000)	-.0052657	.00000
			6	(3.71477-006)+J(0.00000)	.0000037	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(-1.28356-004)+J(0.00000)	-.0001284	.00000
			9	(-1.68864-004)+J(0.00000)	-.0001689	.00000
			10	(1.28946-004)+J(0.00000)	.0001289	.00000
			11	(-3.23882-005)+J(0.00000)	-.0000324	.00000
			12	(5.98422-004)+J(0.00000)	.0005984	.00000
			13	(-1.84328-002)+J(0.00000)	-.0184328	.00000
			14	(-7.33918-003)+J(0.00000)	-.0073392	.00000
			15	(-1.86993-003)+J(0.00000)	-.0018700	.00000
			16	(1.36792-007)+J(0.00000)	.0000001	.00000
			17	(-1.86386-002)+J(0.00000)	-.0186386	.00000

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(-1.36871+002)+J(0.00000)	0.00000	1.00000	1	(-1.49203-002)+J(0.00000)	-.0149203	.00000
			2	(-6.00862-003)+J(0.00000)	-.0060086	.00000
			3	(-2.95896-002)+J(0.00000)	-.0295896	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(-7.17768-005)+J(0.00000)	-.0000718	.00000
			7	(6.69670-001)+J(0.00000)	.6696698	.00000
			8	(-2.40778-003)+J(0.00000)	-.0024078	.00000
			9	(-3.95524-003)+J(0.00000)	-.0039552	.00000
			10	(-4.00570-002)+J(0.00000)	-.0400570	.00000
			11	(1.77803-002)+J(0.00000)	.0177803	.00000
			12	(-3.02859-002)+J(0.00000)	-.0302859	.00000
			13	(7.22674-002)+J(0.00000)	.0722674	.00000
			14	(2.82874-002)+J(0.00000)	.0282874	.00000
			15	(4.91442-002)+J(0.00000)	.0491442	.00000
			16	(8.71951-004)+J(0.00000)	.0008720	.00000
			17	(-1.11602-001)+J(0.00000)	-.1116018	.00000
(-6.57294-001)+J(0.00000)	0.00000	1.00000	1	(1.56087-003)+J(0.00000)	.0015609	.00000
			2	(1.33091-002)+J(0.00000)	.0133091	.00000
			3	(9.94479-002)+J(0.00000)	.0994479	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-9.56966-001)+J(0.00000)	-.9569660	.00000
			6	(-1.13235-003)+J(0.00000)	-.0011323	.00000
			7	(-3.59755-001)+J(0.00000)	-.3597546	.00000
			8	(4.73532-002)+J(0.00000)	.0473532	.00000
			9	(6.69948-002)+J(0.00000)	.0669948	.00000
			10	(5.05694-002)+J(0.00000)	.0505694	.00000
			11	(1.00000+000)+J(0.00000)	1.0000000	.00000
			12	(-3.46474-001)+J(0.00000)	-.3464738	.00000
			13	(5.47005-001)+J(0.00000)	.5470049	.00000
			14	(2.08609-001)+J(0.00000)	.2086089	.00000
			15	(6.81869-002)+J(0.00000)	.0681869	.00000
			16	(-2.74651-002)+J(0.00000)	-.0274651	.00000
			17	(5.56652-001)+J(0.00000)	.5566515	.00000

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(-4.98915+001)+J(8.69210-002)	4.98916+001	1.00000	1	(-6.48159-004)+J(-5.83535-004)	.0008721	-138.00343
			2	(-1.62445-005)+J(-1.00274-005)	.0000191	-148.31375
			3	(-5.52820-004)+J(-1.98204-004)	.0005873	-160.27558
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(7.14537-004)+J(2.71244-004)	.0007643	20.78718
			6	(-1.05953-004)+J(-9.73744-005)	.0001439	-137.41598
			7	(3.94667-004)+J(-1.83261-004)	.0004351	-24.90748
			8	(1.13045-005)+J(-1.70171-005)	.0000204	-56.40382
			9	(-4.06956-004)+J(-6.37343-005)	.0004119	-171.09909
			10	(-1.01375-004)+J(-3.01154-005)	.0001058	-163.45498
			11	(1.29574-001)+J(5.12469-003)	.1296758	2.26488
			12	(2.99854-004)+J(2.64948-004)	.0004001	41.46350
			13	(3.88910-002)+J(3.56159-002)	.0527353	42.48307
			14	(1.46047-002)+J(1.33551-002)	.0197903	42.44094
			15	(2.63409-003)+J(2.34154-003)	.0035244	41.63500
			16	(2.60689-004)+J(3.49944-005)	.0002630	7.64555
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-3.62960+001)+J(0.00000)	0.00000	1.00000	1	(-2.23430-002)+J(0.00000)	-.0223430	.00000
			2	(7.01990-005)+J(0.00000)	.0000702	.00000
			3	(8.99751-002)+J(0.00000)	.0899751	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-1.68566-001)+J(0.00000)	-.1685663	.00000
			6	(-3.75391-003)+J(0.00000)	-.0037539	.00000
			7	(4.57470-002)+J(0.00000)	.0457470	.00000
			8	(3.41857-002)+J(0.00000)	.0341857	.00000
			9	(4.56188-002)+J(0.00000)	.0456188	.00000
			10	(-1.82385-002)+J(0.00000)	-.0182385	.00000
			11	(8.00058-001)+J(0.00000)	.8000576	.00000
			12	(2.39655-001)+J(0.00000)	.2396554	.00000
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(3.65135-001)+J(0.00000)	.3651347	.00000
			15	(-2.65438-001)+J(0.00000)	-.2654380	.00000
			16	(-5.40983-002)+J(0.00000)	-.0540983	.00000
			17	(-9.25691-001)+J(0.00000)	-.9256905	.00000

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(-1.99121+000)+J(0.00000) 0.00000	1.00000	1	(-1.90442-001)+J(0.00000)	-.1904423	.00000
		2	(-9.52810-003)+J(0.00000)	-.0095281	.00000
		3	(-4.60933-002)+J(0.00000)	-.0460933	.00000
		4	(0.00000)+J(0.00000)	.0000000	.00000
		5	(-5.38392-002)+J(0.00000)	-.0538392	.00000
		6	(-8.85155-003)+J(0.00000)	-.0088516	.00000
		7	(-6.46351-002)+J(0.00000)	-.0646351	.00000
		8	(-2.96499-002)+J(0.00000)	-.0296499	.00000
		9	(-3.06980-002)+J(0.00000)	-.0306980	.00000
		10	(-2.21252-002)+J(0.00000)	-.0221252	.00000
		11	(1.04146-002)+J(0.00000)	.0104146	.00000
		12	(1.27022-002)+J(0.00000)	.0127022	.00000
		13	(7.41121-003)+J(0.00000)	.0074112	.00000
		14	(1.00000+000)+J(0.00000)	1.0000000	.00000
		15	(-7.32869-006)+J(0.00000)	-.0000073	.00000
		16	(-3.30734-002)+J(0.00000)	-.0330734	.00000
		17	(2.88085-002)+J(0.00000)	.0288085	.00000
(-8.60677-001)+J(0.00000) 0.00000	1.00000	1	(9.11590-001)+J(0.00000)	.9115904	.00000
		2	(2.33019-001)+J(0.00000)	.2330188	.00000
		3	(3.10926-001)+J(0.00000)	.3109262	.00000
		4	(0.00000)+J(0.00000)	.0000000	.00000
		5	(1.00000+000)+J(0.00000)	1.0000000	.00000
		6	(9.28436-002)+J(0.00000)	.0928436	.00000
		7	(6.49865-001)+J(0.00000)	.6498654	.00000
		8	(1.59802-001)+J(0.00000)	.1598019	.00000
		9	(1.62630-001)+J(0.00000)	.1626298	.00000
		10	(2.17323-001)+J(0.00000)	.2173233	.00000
		11	(-2.81899-001)+J(0.00000)	-.2818989	.00000
		12	(-3.19110-001)+J(0.00000)	-.3191100	.00000
		13	(-3.75118-001)+J(0.00000)	-.3751178	.00000
		14	(-5.48005-001)+J(0.00000)	-.5480049	.00000
		15	(-4.68525-001)+J(0.00000)	-.4685248	.00000
		16	(1.71530-001)+J(0.00000)	.1715301	.00000
		17	(-1.89284-001)+J(0.00000)	-.1892837	.00000

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(-4.97261+000)+J(2.73287-001)	4.98011+000	.99849	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-3.70614-002)+J(1.93287-003)	.0371118	177.01455
			3	(7.94678-001)+J(-6.39927-002)	.7972506	-4.60390
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-6.20846-002)+J(2.23278-002)	.0659775	160.21964
			6	(-1.30142-002)+J(9.59135-004)	.0130495	175.78497
			7	(1.43546-001)+J(8.22479-004)	.1435485	.32829
			8	(5.27945-001)+J(-3.83440-002)	.5293352	-4.15403
			9	(6.96318-001)+J(-5.44124-002)	.6984402	-4.46819
			10	(3.84915-001)+J(-3.74027-002)	.3867283	-5.55007
			11	(3.83218-001)+J(-5.06022-002)	.3865446	-7.52212
			12	(3.42390-001)+J(-4.40148-002)	.3452074	-7.32530
			13	(4.70635-001)+J(-6.02610-002)	.4744777	-7.29655
			14	(-1.09941-004)+J(-1.73042-002)	.0173046	-90.36402
			15	(7.50034-001)+J(-1.00782-001)	.7567743	-7.65296
			16	(9.15339-001)+J(-8.88432-002)	.9196406	-5.54379
			17	(5.98767-001)+J(-1.06387-001)	.6081452	-10.07502
(-1.89650+001)+J(4.90858+000)	1.95899+001	.96810	1	(-2.54080-002)+J(-1.73256-002)	.0307530	-145.71008
			2	(-5.57364-003)+J(-8.71169-003)	.0103421	-122.61066
			3	(-1.82633-001)+J(-2.15657-001)	.2826003	-130.26019
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.26139-001)+J(-1.51637-001)	.1972425	-50.24468
			6	(-3.99570-004)+J(-2.39448-003)	.0024276	-99.47371
			7	(-1.33917-002)+J(-1.55568-001)	.1561430	-94.92005
			8	(-5.77160-002)+J(5.35599-002)	.0787369	137.13899
			9	(-6.40233-002)+J(7.04655-002)	.0952070	132.25754
			10	(1.09003-001)+J(1.00554-001)	.1482997	42.69126
			11	(1.78450-001)+J(2.94657-001)	.3444806	58.80007
			12	(7.97401-002)+J(2.08956-001)	.2236536	69.11251
			13	(1.41931-001)+J(3.17983-001)	.3482209	65.94650
			14	(5.36393-002)+J(1.03918-001)	.1169446	62.69849
			15	(7.93487-001)+J(8.95908-002)	.7985290	6.44185
			16	(2.20431-001)+J(2.98777-001)	.3712915	53.58096
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000

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(-2.13018+001)+J( 0.00000     )  0.00000       1.00000   1  (-1.32935-002)+J( 0.00000      )  -.0132935       .00000
                                                         2  (-4.34377-003)+J( 0.00000      )  -.0043438       .00000
                                                         3  (-6.20891-003)+J( 0.00000      )  -.0062089       .00000
                                                         4  ( 0.00000     )+J( 0.00000      )   .0000000       .00000
                                                         5  ( 1.33754-001)+J( 0.00000      )   .1337542       .00000
                                                         6  (-6.81811-004)+J( 0.00000      )  -.0006818       .00000
                                                         7  ( 7.65671-002)+J( 0.00000      )   .0765671       .00000
                                                         8  (-3.79905-002)+J( 0.00000      )  -.0379905       .00000
                                                         9  (-6.69887-002)+J( 0.00000      )  -.0669887       .00000
                                                        10  ( 1.29369-001)+J( 0.00000      )   .1293693       .00000
                                                        11  ( 1.15282-001)+J( 0.00000      )   .1152821       .00000
                                                        12  ( 6.09166-002)+J( 0.00000      )   .0609166       .00000
                                                        13  ( 1.06355-001)+J( 0.00000      )   .1063546       .00000
                                                        14  ( 3.62134-002)+J( 0.00000      )   .0362134       .00000
                                                        15  (-6.52842-001)+J( 0.00000      )  -.6528424       .00000
                                                        16  ( 1.00000+000)+J( 0.00000      )  1.0000000       .00000
                                                        17  (-6.69933-002)+J( 0.00000      )  -.0669933       .00000

(-1.92303+001)+J( 0.00000     )  0.00000       1.00000   1  (-4.40369-003)+J( 0.00000      )  -.0044037       .00000
                                                         2  (-2.88986-003)+J( 0.00000      )  -.0028899       .00000
                                                         3  (-1.36992-001)+J( 0.00000      )  -.1369923       .00000
                                                         4  ( 0.00000     )+J( 0.00000      )   .0000000       .00000
                                                         5  ( 6.22370-003)+J( 0.00000      )   .0062237       .00000
                                                         6  (-3.08760-005)+J( 0.00000      )  -.0000309       .00000
                                                         7  (-5.90396-002)+J( 0.00000      )  -.0590396       .00000
                                                         8  (-1.74743-003)+J( 0.00000      )  -.0017474       .00000
                                                         9  ( 3.87614-002)+J( 0.00000      )   .0387614       .00000
                                                        10  ( 1.36867-002)+J( 0.00000      )   .0136867       .00000
                                                        11  ( 2.67996-002)+J( 0.00000      )   .0267996       .00000
                                                        12  ( 1.67261-002)+J( 0.00000      )   .0167261       .00000
                                                        13  ( 4.31541-003)+J( 0.00000      )   .0043154       .00000
                                                        14  ( 1.72128-003)+J( 0.00000      )   .0017213       .00000
                                                        15  (-2.37427-001)+J( 0.00000      )  -.2374270       .00000
                                                        16  ( 1.00000+000)+J( 0.00000      )  1.0000000       .00000
                                                        17  ( 3.23949-001)+J( 0.00000      )   .3239487       .00000
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(-2.10817+001)+J( 0.00000    )  0.00000        1.00000  1  (-9.63879-003)+J( 0.00000    )  -.0096388     .00000
                                                         2  (-3.78960-003)+J( 0.00000    )  -.0037896     .00000
                                                         3  (-5.88155-002)+J( 0.00000    )  -.0588155     .00000
                                                         4  ( 0.00000     )+J( 0.00000    )   .0000000     .00000
                                                         5  ( 8.30378-002)+J( 0.00000    )   .0830378     .00000
                                                         6  (-4.39903-004)+J( 0.00000    )  -.0004399     .00000
                                                         7  ( 2.10316-002)+J( 0.00000    )   .0210316     .00000
                                                         8  (-2.34083-002)+J( 0.00000    )  -.0234083     .00000
                                                         9  (-5.53855-002)+J( 0.00000    )  -.0553855     .00000
                                                        10  ( 8.42988-002)+J( 0.00000    )   .0842988     .00000
                                                        11  ( 8.32685-002)+J( 0.00000    )   .0832685     .00000
                                                        12  ( 4.51612-002)+J( 0.00000    )   .0451612     .00000
                                                        13  ( 6.78967-002)+J( 0.00000    )   .0678967     .00000
                                                        14  ( 2.31710-002)+J( 0.00000    )   .0231710     .00000
                                                        15  (-4.38735-001)+J( 0.00000    )  -.4387353     .00000
                                                        16  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                        17  ( 1.51368-001)+J( 0.00000    )   .1513683     .00000

(-1.00000+001)+J( 0.00000    )  0.00000        1.00000  1  (-1.47661-001)+J( 0.00000    )  -.1476614     .00000
                                                         2  (-2.18736-002)+J( 0.00000    )  -.0218736     .00000
                                                         3  ( 4.46440-002)+J( 0.00000    )   .0446440     .00000
                                                         4  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                         5  ( 2.09997-001)+J( 0.00000    )   .2099967     .00000
                                                         6  (-7.94611-003)+J( 0.00000    )  -.0079461     .00000
                                                         7  ( 2.43193-001)+J( 0.00000    )   .2431926     .00000
                                                         8  (-1.22436-001)+J( 0.00000    )  -.1224359     .00000
                                                         9  (-1.49990-001)+J( 0.00000    )  -.1499897     .00000
                                                        10  (-9.68209-003)+J( 0.00000    )  -.0096821     .00000
                                                        11  ( 5.54380-001)+J( 0.00000    )   .55438[illegible]0     .00000
                                                        12  ( 4.81045-001)+J( 0.00000    )   .48104[illegible]7     .00000
                                                        13  ( 5.79692-001)+J( 0.00000    )   .5796922     .00000
                                                        14  ( 1.44830-001)+J( 0.00000    )   .1448295     .00000
                                                        15  ( 8.47089-001)+J( 0.00000    )   .8470891     .00000
                                                        16  (-2.95396-001)+J( 0.00000    )  -.2953957     .00000
                                                        17  ( 6.23213-001)+J( 0.00000    )   .6232134     .00000
```

F100 LINEAR MODEL 20/0/0K 2/12/76

**** THE MATRICES IN FINAL FORM ****

CASE 5

F-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
SNFAN	-2.3492+000	2.0245+000	-4.9105+000	1.4596+000	-3.6962-001	0.0000	5.6406+000	-1.9912+000	-5.0150-001	-6.6826-001
SNCOM	-2.3849-001	-4.1454+000	-2.6559-001	1.3604-001	1.0999+000	0.0000	-6.6526-001	1.6465+000	-7.3871-002	-1.2158-001
PT7M	1.8841+000	-7.4861+000	-2.3289+001	6.9913-001	5.0037-001	0.0000	3.8729+000	3.8084+000	-3.3112-001	-4.5962-001
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	6.7160+001	6.5228+002	7.5041+001	-4.8752+001	-1.3696+002	0.0000	1.5992+001	-3.4192+002	2.0758+001	4.1401+001
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5000-001	0.0000	0.0000	0.0000	0.0000
PT45	3.1031+001	1.0530+002	4.3146+002	-5.3308+000	3.3725+002	0.0000	-8.2109+002	-6.2224+001	-6.2588-001	-2.5836+001
TT25H	3.1173+000	-3.0791+000	3.5906+000	-2.9047+000	8.8397-001	0.0000	5.8636-001	-1.6689+001	1.0058+000	1.2376+000
TT25C	2.8858+000	-5.4524+000	4.5352+000	-3.5480+000	1.2014+000	0.0000	7.2915-001	4.6943+000	-1.8713+001	1.5741+000
TT3	-2.1079+000	1.2965+000	-2.3529+000	1.9001+000	4.1301+000	0.0000	-3.7803-001	1.7588+001	-6.6055-001	-2.0805+001
TT4PHI	-2.9449-002	-1.1783-001	-2.9461-002	1.0216-001	-2.0795-002	0.0000	-1.0399-002	1.5075-001	-1.7528-002	3.9652+000
TT4	-1.2550+001	-1.1580+002	-1.3992+001	2.9483+001	3.7587+000	0.0000	-2.2525+000	6.4482+001	-3.9481+000	1.8449+001
TT45HI	3.1978-001	3.2974+000	3.4301-001	1.0269-001	-1.4316+001	0.0000	1.3372+001	-1.4494+000	1.0271-001	7.0146+000
TT45LO	1.2772-001	1.3197+000	1.3695-001	4.0925-002	-5.7255+000	0.0000	5.3481+000	-5.7942-001	4.1277-002	2.8058+000
TT5	2.5737-001	9.4607-001	4.2885+000	1.0140-001	-6.2066+000	0.0000	1.3676+000	-1.5531-001	-4.8233-003	2.9960+000
TT6C	-3.3196-002	6.7742-001	1.1110-001	-9.2020-002	-1.0551-002	0.0000	1.7328-002	-3.3807-001	1.9900+001	1.6947-001
TT7M	-1.0112+001	4.2687+001	1.6420+000	-7.6782+000	9.1649-001	0.0000	1.7595+001	-2.0853+001	2.8916+000	3.1547+000

F-MATRIX

	TT4PHI	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	2.7130+000	-3.8307+000	3.9387-001	-2.5529-001	-3.4550-001	-4.0557-001	-3.3674-001
SNCOM	3.9303-001	-1.2247-001	-4.8866-002	-4.8864-002	-4.7288-002	-5.4183-002	-4.8867-002
PT7M	1.3436+000	-2.6550+000	-1.7217-001	-1.6118-001	1.0147+000	4.2184-001	1.5034-001
WFCOM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	-1.1113+002	1.7675+002	1.3941+001	1.3874+001	1.3404+001	1.5463+001	1.3944+001
FTIT	0.0000	0.0000	1.2336-001	1.3707-002	0.0000	0.0000	0.0000
PT45	7.5338+000	5.8926+001	-1.0748+000	-1.0751+000	1.7453+000	3.2631+000	-1.0750+000
TT25H	-5.4142+000	6.9317+000	6.8710-001	6.8360-001	5.6086-001	7.6468-001	6.8704-001
TT25C	-6.9816+000	8.9188+000	8.7259-001	8.7944-001	8.4078-001	9.6995-001	8.7081-001
TT3	3.5808+000	-4.5832+000	-4.4824-001	-4.4826-001	-4.3325-001	-4.9699-001	-4.4938-001
TT4PHI	-4.9948+001	4.5919+001	-6.9327-003	-6.9323-003	-8.6636-003	-8.6654-003	-6.9318-003
TT4	2.1387+001	-7.5371+001	-2.6709+000	-2.6654+000	-2.5787+000	-2.9637+000	-2.6756+000
TT45HI	-6.1150-001	4.6386+001	-4.9928+001	7.2334-002	7.2772-002	7.9616-002	7.2336-002
TT45LO	-2.4735-001	1.8549+001	-1.7972+001	-1.9703+000	2.9568-002	3.2021-002	2.9387-002
TT5	-4.8509-003	1.9829+001	-1.3703+000	-1.5509-001	-1.9969+001	3.9780-002	-3.5959-003
TT6C	-2.4658-001	3.2707-001	2.9520-002	2.9516-002	1.9077-002	-1.9970+001	1.9083-002
TT7M	-1.5845+001	1.6530+001	1.9885+000	1.9882+000	3.4572+001	1.9849+001	-4.8013+001

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G-MATRIX

	WFMBH	ANMTX	CIVV	RCVV	BLC
SNFAN	0.0000	-6.6062-002	6.7375-002	-1.1471-002	-1.3924+000
SNCOM	0.0000	-1.5230-002	7.9371-003	1.0779-001	-9.0172-002
PT7M	0.0000	-3.5801+000	-8.0398-002	2.7102-001	-7.4541-001
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	0.0000	3.3667+000	-2.2586+000	-2.4551+001	-7.5190+001
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT45	0.0000	-2.6611+000	-1.1058+000	-3.5731+000	3.6395+001
TT25H	0.0000	1.6902-001	-5.4327-002	-2.9449-002	2.6474+000
TT25C	0.0000	2.1279-001	-8.8668-002	7.9771-003	3.2767+000
TT3	0.0000	-8.5825-002	7.1966-002	5.3147-001	-1.9852+000
TT4PHI	0.0000	-2.2523-003	1.0248-003	1.2315-002	-2.3511+000
TT4	0.0000	-7.9752-001	4.1924-001	4.5857+000	1.6293+001
TT45HI	0.0000	9.1095-003	-1.1292-002	-1.0893-001	-2.9553+000
TT45LO	0.0000	3.9231-003	-4.5267-003	-4.3678-002	-1.1836+000
TT5	0.0000	-2.4752-002	-1.0296-002	-9.0957-003	-1.1268+000
TT6C	0.0000	7.6108-003	1.7442-003	-2.7995-002	1.4278-001
TT7M	0.0000	5.4250-001	3.9905-001	-1.8470+000	8.4866+000

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
FNMX	4.9967-001	-2.1214+000	4.2398+000	3.5081-001	1.1361-001	0.0000	1.0278+000	1.0368+000	-1.2261-001	-1.8866-001
WFAN	9.0297-001	2.3190-001	-2.6958-001	2.1503-001	-6.6778-002	0.0000	-4.3330-002	-2.3344-001	-7.5807-002	-9.2579-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-1.4418+000	5.2568+000	-6.1130+000	4.8339+000	-1.5141+000	0.0000	-9.8159-001	-5.2935+000	-1.7189+000	-2.0994+000
SMHC	7.2668+000	1.3004+002	8.1094+000	-2.9858+000	-1.3783+001	0.0000	1.3071+000	-6.8987+001	2.2853+000	2.7896+000
DP25QT	9.2946-002	-4.9151-002	-5.4347-001	4.1666-001	-1.0737-001	0.0000	-8.8413-002	-1.4672-001	-7.5097-002	-1.8807-001
DP25SC	5.4398-002	-3.3075-002	-1.1506-001	8.8020-002	-2.1284-002	0.0000	-1.8840-002	2.4514-003	-5.9414-004	-4.0024-002

H-MATRIX

	TT4PHI	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	6.4384-001	-1.0757+000	-7.9507-002	-8.1457-002	2.4483-001	7.9014-002	-8.3993-002
WFAN	4.1082-001	-5.2544-001	-5.1405-002	-5.1190-002	-4.9442-002	-5.7018-002	-5.1320-002
TT4	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	9.3108+000	-1.1911+001	-1.1650+000	-1.1607+000	-1.1195+000	-1.2923+000	-1.1642+000
SMHC	-1.2379+001	1.5837+001	1.5480+000	1.5421+000	1.4932+000	1.7175+000	1.5515+000
DP25QT	8.3175-001	-1.0643+000	-1.0389-001	-1.0404-001	-1.0020-001	-1.1591-001	-1.0387-001
DP25SC	1.7691-001	-2.2629-001	-2.2082-002	-2.2060-002	-2.1185-002	-2.4872-002	-2.2074-002

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D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	0.0000	-5.0453-002	-2.0171-002	8.5833-002	-3.8174-001
WFAN	0.0000	-1.2635-002	-3.4125-002	2.1107-003	-1.9481-001
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	-2.8265-001	1.0040+000	4.7197-002	-4.5238+000
SMHC	0.0000	8.9857-001	-2.3103-001	-3.0732+000	9.7159-001
DP25QT	0.0000	-2.5417-002	6.0474-003	2.2971-002	-3.9454-001
DP25SC	0.0000	-5.5184-003	-1.8393-003	5.7833-003	-8.0019-002

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(0.00000)+J(0.00000)	.0000000	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
(-8.30702+002)+J(0.00000)	0.00000	1.00000	1	(-4.42670-003)+J(0.00000)	-.0044267	.00000
			2	(8.31550-004)+J(0.00000)	.0008315	.00000
			3	(-4.75837-003)+J(0.00000)	-.0047584	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-2.30006-002)+J(0.00000)	-.0230006	.00000
			6	(2.74966-006)+J(0.00000)	.0000027	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(-6.38887-004)+J(0.00000)	-.0006389	.00000
			9	(-7.94214-004)+J(0.00000)	-.0007942	.00000
			10	(5.60678-004)+J(0.00000)	.0005607	.00000
			11	(-1.63013-004)+J(0.00000)	-.0001630	.00000
			12	(2.92981-003)+J(0.00000)	.0029298	.00000
			13	(-1.77251-002)+J(0.00000)	-.0177251	.00000
			14	(-7.06357-003)+J(0.00000)	-.0070636	.00000
			15	(-1.94262-003)+J(0.00000)	-.0019426	.00000
			16	(-2.53908-006)+J(0.00000)	-.0000025	.00000
			17	(-2.24783-002)+J(0.00000)	-.0224783	.00000

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(-1.44423+002)+J( 0.00000    ) 0.00000        1.00000   1  (-1.26527-002)+J( 0.00000   )  -.0126527    .00000
                                                        2  (-5.66345-003)+J( 0.00000   )  -.0056634    .00000
                                                        3  (-2.13002-002)+J( 0.00000   )  -.0213002    .00000
                                                        4  ( 0.00000     )+J( 0.00000   )   .0000000    .00000
                                                        5  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                        6  (-9.67516-005)+J( 0.00000   )  -.0000968    .00000
                                                        7  ( 4.81546-001)+J( 0.00000   )   .4815457    .00000
                                                        8  (-5.06914-003)+J( 0.00000   )  -.0050691    .00000
                                                        9  (-7.10677-003)+J( 0.00000   )  -.0071068    .00000
                                                       10  (-3.38125-002)+J( 0.00000   )  -.0338125    .00000
                                                       11  ( 2.35588-002)+J( 0.00000   )   .0235588    .00000
                                                       12  (-4.49937-002)+J( 0.00000   )  -.0449937    .00000
                                                       13  ( 1.08358-001)+J( 0.00000   )   .1083581    .00000
                                                       14  ( 4.24258-002)+J( 0.00000   )   .0424258    .00000
                                                       15  ( 5.46013-002)+J( 0.00000   )   .0546013    .00000
                                                       16  ( 1.37005-003)+J( 0.00000   )   .0013700    .00000
                                                       17  (-1.07007-001)+J( 0.00000   )  -.1070069    .00000

(-8.69020+001)+J( 0.00000    ) 0.00000        1.00000   1  (-7.78497-003)+J( 0.00000   )  -.0077850    .00000
                                                        2  (-8.20829-003)+J( 0.00000   )  -.0082083    .00000
                                                        3  (-2.67362-002)+J( 0.00000   )  -.0267362    .00000
                                                        4  ( 0.00000     )+J( 0.00000   )   .0000000    .00000
                                                        5  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                        6  (-7.17675-005)+J( 0.00000   )  -.0000718    .00000
                                                        7  ( 4.56901-001)+J( 0.00000   )   .4569006    .00000
                                                        8  (-3.81959-002)+J( 0.00000   )  -.0381959    .00000
                                                        9  (-5.00002-002)+J( 0.00000   )  -.0500002    .00000
                                                       10  (-3.41207-002)+J( 0.00000   )  -.0341207    .00000
                                                       11  (-1.71519-001)+J( 0.00000   )  -.1715189    .00000
                                                       12  ( 1.41557-001)+J( 0.00000   )   .1415568    .00000
                                                       13  ( 4.83378-002)+J( 0.00000   )   .0483378    .00000
                                                       14  ( 1.86521-002)+J( 0.00000   )   .0186521    .00000
                                                       15  ( 4.57407-002)+J( 0.00000   )   .0457407    .00000
                                                       16  ( 1.36752-002)+J( 0.00000   )   .0136752    .00000
                                                       17  (-4.17283-001)+J( 0.00000   )  -.4172833    .00000
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(-4.98799+001)+J(1.40796-001)	4.98801+001	1.00000	1	(-9.38231-004)+J(-1.21514-003)	.0015352	-127.67243
			2	(-2.74079-005)+J(-9.14014-006)	.0000289	-161.55721
			3	(-6.51566-004)+J(-3.22912-005)	.0006524	-177.16278
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(9.00587-004)+J(3.14823-004)	.0009540	19.26834
			6	(-1.38144-004)+J(-2.01468-004)	.0002443	-124.43783
			7	(-1.41784-004)+J(1.00188-004)	.0001736	144.75399
			8	(-2.72168-004)+J(-4.57073-005)	.0002760	-170.46682
			9	(1.47818-004)+J(-6.42007-005)	.0001612	-23.47632
			10	(3.33980-005)+J(-1.25417-005)	.0000357	-20.56228
			11	(1.34568-001)+J(1.36016-002)	.1352534	5.77164
			12	(3.16626-004)+J(4.49989-004)	.0005502	54.86863
			13	(5.35736-002)+J(7.76593-002)	.0943456	55.39996
			14	(2.00915-002)+J(2.91153-002)	.0353747	55.39175
			15	(2.75481-003)+J(3.50277-003)	.0044625	51.71529
			16	(2.94050-004)+J(4.22843-005)	.0002971	8.18302
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-7.56595-001)+J(0.00000)	0.00000	1.00000	1	(8.06004-001)+J(0.00000)	.8060037	.00000
			2	(2.19064-001)+J(0.00000)	.2190639	.00000
			3	(1.27380-001)+J(0.00000)	.1273802	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(1.06461-001)+J(0.00000)	.1064612	.00000
			7	(4.93547-001)+J(0.00000)	.4935470	.00000
			8	(1.45940-001)+J(0.00000)	.1459399	.00000
			9	(1.31392-001)+J(0.00000)	.1313922	.00000
			10	(2.87425-001)+J(0.00000)	.2874255	.00000
			11	(-2.57323-001)+J(0.00000)	-.2573225	.00000
			12	(-2.99399-001)+J(0.00000)	-.2993993	.00000
			13	(-3.79814-001)+J(0.00000)	-.3798145	.00000
			14	(-5.16328-001)+J(0.00000)	-.5163277	.00000
			15	(-4.71657-001)+J(0.00000)	-.4716572	.00000
			16	(1.39234-001)+J(0.00000)	.1392343	.00000
			17	(-1.46898-001)+J(0.00000)	-.1468978	.00000

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(-2.01838+000)+J(0.00000)	0.00000	1.00000	1	(-2.83980-001)+J(0.00000)	-.2839800	.00000
			2	(-1.60599-003)+J(0.00000)	-.0016060	.00000
			3	(-4.62353-002)+J(0.00000)	-.0462353	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-1.17883-002)+J(0.00000)	-.0117883	.00000
			6	(-6.62147-003)+J(0.00000)	-.0066215	.00000
			7	(-3.94991-002)+J(0.00000)	-.0394991	.00000
			8	(-2.99705-002)+J(0.00000)	-.0299705	.00000
			9	(-2.15619-002)+J(0.00000)	-.0215619	.00000
			10	(-1.51016-002)+J(0.00000)	-.0151016	.00000
			11	(-7.81664-003)+J(0.00000)	-.0078166	.00000
			12	(-6.84634-003)+J(0.00000)	-.0068463	.00000
			13	(-1.61944-002)+J(0.00000)	-.0161944	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(-3.14161-002)+J(0.00000)	-.0314161	.00000
			16	(-2.16974-002)+J(0.00000)	-.0216974	.00000
			17	(6.49254-002)+J(0.00000)	.0649254	.00000
(-5.14710+000)+J(2.27109+000)	5.62585+000	.91490	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-4.68217-002)+J(1.14622-002)	.0482042	166.24422
			3	(1.97857-001)+J(-7.02959-002)	.2099737	-19.55945
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-3.26651-001)+J(3.13099-001)	.4524735	136.21353
			6	(-1.16192-002)+J(5.56998-003)	.0128853	154.38795
			7	(-1.23018-002)+J(9.45997-002)	.0953962	97.40921
			8	(4.39269-001)+J(-2.97160-001)	.5303409	-34.07789
			9	(5.09791-001)+J(-3.84695-001)	.6386520	-37.03868
			10	(1.32181-001)+J(-1.63586-001)	.2103146	-51.06092
			11	(2.62468-001)+J(-3.40430-001)	.4298625	-52.36614
			12	(2.61014-001)+J(-3.04457-001)	.4010269	-49.39317
			13	(3.61071-001)+J(-4.20764-001)	.5544496	-49.36606
			14	(-2.13520-002)+J(-1.28257-001)	.1300221	-99.45180
			15	(4.53269-001)+J(-6.09685-001)	.7597157	-53.37113
			16	(5.83421-001)+J(-6.04811-001)	.8403431	-46.03134
			17	(1.64828-001)+J(-6.36732-001)	.6577205	-75.48666

F100 LINEAR MODEL 20/0/0K 2/12/76

(-2.46875+001)+J(8.37918+000)	2.60707+001	.94694	1	(8.07633-004)+J(-2.69416-002)	.0269537	-88.28295
			2	(1.09503-004)+J(-3.73349-003)	.0037351	-88.32000
			3	(-3.62220-002)+J(-1.06615-001)	.1126000	-108.76500
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.90510-001)+J(-7.62534-002)	.3003512	-14.70728
			6	(1.81463-003)+J(-1.80831-003)	.0025618	-44.90007
			7	(9.61136-002)+J(-7.41494-002)	.1213918	-37.64934
			8	(-8.45437-002)+J(-4.89906-003)	.0846855	-176.68359
			9	(-1.04082-001)+J(-2.34974-003)	.1041089	-178.70672
			10	(2.97099-002)+J(5.19306-002)	.0598286	60.22573
			11	(-1.39322-001)+J(4.29440-001)	.4514743	107.97451
			12	(-1.56972-001)+J(2.06369-001)	.2592840	127.25802
			13	(-2.28535-001)+J(4.62848-001)	.5161944	116.27829
			14	(-7.29466-002)+J(1.67590-001)	.1827775	113.52196
			15	(5.47108-001)+J(2.30284-001)	.5935977	22.82681
			16	(9.80968-002)+J(1.88159-001)	.2121955	62.46473
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-2.48164+001)+J(0.00000)	0.00000	1.00000	1	(-1.38877-002)+J(0.00000)	-.0138877	.00000
			2	(-5.46576-003)+J(0.00000)	-.0054658	.00000
			3	(-2.52413-001)+J(0.00000)	-.2524132	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.56405-001)+J(0.00000)	.1564051	.00000
			6	(7.49634-004)+J(0.00000)	.0007496	.00000
			7	(-7.16332-002)+J(0.00000)	-.0716332	.00000
			8	(-5.06457-002)+J(0.00000)	-.0506457	.00000
			9	(-6.51831-002)+J(0.00000)	-.0651831	.00000
			10	(9.55800-002)+J(0.00000)	.0955800	.00000
			11	(-3.12137-002)+J(0.00000)	-.0312137	.00000
			12	(-2.55856-002)+J(0.00000)	-.0255856	.00000
			13	(-1.39074-001)+J(0.00000)	-.1390741	.00000
			14	(-4.81079-002)+J(0.00000)	-.0481079	.00000
			15	(5.35059-001)+J(0.00000)	.5350587	.00000
			16	(3.15078-001)+J(0.00000)	.3150778	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000

AD-A052 346 SYSTEMS CONTROL INC PALO ALTO CALIF AERONAUTICAL AND--ETC F/G 21/5
F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM. VOLUME II. APPEND--ETC(U)
JUN 77 R L DE HOFF, W E HALL, R J ADAMS F33615-75-C-2053
UNCLASSIFIED AFAPL-TR-77-35-VOL-2 NL

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AD A052346

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F100 LINEAR MODEL   20/0/0K   2/12/76

(-1.95182+001)+J( 0.00000    )  0.00000      1.00000   1  (-1.05475-003)+J( 0.00000    )  -.0010547     .00000
                                                       2  (-1.10432-003)+J( 0.00000    )  -.0011043     .00000
                                                       3  (-9.43474-002)+J( 0.00000    )  -.0943474     .00000
                                                       4  ( 0.00000     )+J( 0.00000    )   .0000000     .00000
                                                       5  (-3.19795-002)+J( 0.00000    )  -.0319795     .00000
                                                       6  ( 8.83881-005)+J( 0.00000    )   .0000884     .00000
                                                       7  (-6.13675-002)+J( 0.00000    )  -.0613675     .00000
                                                       8  ( 7.13475-003)+J( 0.00000    )   .0071348     .00000
                                                       9  ( 2.41310-002)+J( 0.00000    )   .0241310     .00000
                                                      10  (-1.74194-002)+J( 0.00000    )  -.0174194     .00000
                                                      11  ( 6.09486-004)+J( 0.00000    )   .0006095     .00000
                                                      12  ( 1.87973-003)+J( 0.00000    )   .0018797     .00000
                                                      13  (-1.33152-002)+J( 0.00000    )  -.0133152     .00000
                                                      14  (-4.41126-003)+J( 0.00000    )  -.0044113     .00000
                                                      15  (-5.51690-001)+J( 0.00000    )  -.5516902     .00000
                                                      16  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                      17  (-2.35775-002)+J( 0.00000    )  -.0235775     .00000

(-2.12357+001)+J( 0.00000    )  0.00000      1.00000   1  (-2.11206-002)+J( 0.00000    )  -.0211206     .00000
                                                       2  (-6.64017-003)+J( 0.00000    )  -.0066402     .00000
                                                       3  (-1.11455-001)+J( 0.00000    )  -.1114552     .00000
                                                       4  ( 0.00000     )+J( 0.00000    )   .0000000     .00000
                                                       5  ( 1.62155-001)+J( 0.00000    )   .1621546     .00000
                                                       6  (-6.34317-004)+J( 0.00000    )  -.0006343     .00000
                                                       7  ( 1.49486-002)+J( 0.00000    )   .0149486     .00000
                                                       8  (-4.88548-002)+J( 0.00000    )  -.0488548     .00000
                                                       9  (-6.43458-002)+J( 0.00000    )  -.0643458     .00000
                                                      10  ( 1.78882-001)+J( 0.00000    )   .1788825     .00000
                                                      11  ( 1.58581-001)+J( 0.00000    )   .1585811     .00000
                                                      12  ( 8.39561-002)+J( 0.00000    )   .0839561     .00000
                                                      13  ( 1.03999-001)+J( 0.00000    )   .1039991     .00000
                                                      14  ( 3.51567-002)+J( 0.00000    )   .0351567     .00000
                                                      15  (-4.92174-001)+J( 0.00000    )  -.4921743     .00000
                                                      16  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                      17  ( 1.32261-001)+J( 0.00000    )   .1322610     .00000
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F100 LINEAR MODEL   20/0/0K   2/12/76

(-2.04021+001)+J( 0.00000    ) 0.00000      1.00000  1  (-4.69964-003)+J( 0.00000    )  -.0046996    .00000
                                                     2  (-2.43394-003)+J( 0.00000    )  -.0024339    .00000
                                                     3  (-1.15378-001)+J( 0.00000    )  -.1153783    .00000
                                                     4  ( 0.00000     )+J( 0.00000    )   .0000000    .00000
                                                     5  (-2.00580-002)+J( 0.00000    )  -.0200580    .00000
                                                     6  (-2.03537-004)+J( 0.00000    )  -.0002035    .00000
                                                     7  (-6.62148-002)+J( 0.00000    )  -.0662148    .00000
                                                     8  ( 4.10590-003)+J( 0.00000    )   .0041059    .00000
                                                     9  (-2.05607-002)+J( 0.00000    )  -.0205607    .00000
                                                    10  ( 1.57606-002)+J( 0.00000    )   .0157606    .00000
                                                    11  ( 5.14703-002)+J( 0.00000    )   .0514703    .00000
                                                    12  ( 3.17425-002)+J( 0.00000    )   .0317425    .00000
                                                    13  ( 3.20546-002)+J( 0.00000    )   .0320546    .00000
                                                    14  ( 1.07483-002)+J( 0.00000    )   .0107483    .00000
                                                    15  (-4.74330-001)+J( 0.00000    )  -.4743299    .00000
                                                    16  ( 1.00000+000)+J( 0.00000    )  1.0000000    .00000
                                                    17  ( 6.23153-002)+J( 0.00000    )   .0623153    .00000

(-1.00000+001)+J( 0.00000    ) 0.00000      1.00000  1  (-6.46560-002)+J( 0.00000    )  -.0646560    .00000
                                                     2  (-2.66111-002)+J( 0.00000    )  -.0266111    .00000
                                                     3  ( 1.01094-001)+J( 0.00000    )   .1010939    .00000
                                                     4  ( 9.27429-001)+J( 0.00000    )   .9274290    .00000
                                                     5  ( 1.00261-001)+J( 0.00000    )   .1002608    .00000
                                                     6  (-8.28725-003)+J( 0.00000    )  -.0082872    .00000
                                                     7  ( 1.29762-001)+J( 0.00000    )   .1297621    .00000
                                                     8  (-2.20674-002)+J( 0.00000    )  -.0220674    .00000
                                                     9  (-5.39321-003)+J( 0.00000    )  -.0053932    .00000
                                                    10  ( 2.05111-002)+J( 0.00000    )   .0205111    .00000
                                                    11  ( 6.28001-001)+J( 0.00000    )   .6280009    .00000
                                                    12  ( 5.43022-001)+J( 0.00000    )   .5430221    .00000
                                                    13  ( 6.37214-001)+J( 0.00000    )   .6372142    .00000
                                                    14  ( 1.59889-001)+J( 0.00000    )   .1598891    .00000
                                                    15  ( 1.00000+000)+J( 0.00000    )  1.0000000    .00000
                                                    16  (-1.04872-002)+J( 0.00000    )  -.0104872    .00000
                                                    17  ( 8.00288-001)+J( 0.00000    )   .8002882    .00000
```

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

CASE 6

**** THE MATRICES IN FINAL FORM ****

F-MATRIX

	SNFAN	SNCOM	PT7M	PT3	PT45	TT25H	TT25C	TT3	TT4PHI	TT4PLO
SNFAN	-2.3390+000	2.6380+000	-5.0974+000	-4.6139-001	3.7327+000	-2.1297+000	-5.3483-001	-4.3291-001	-2.7063-001	-3.5571-001
SNCOM	-2.4125-001	-3.9330+000	-2.7655-001	1.0675+000	-6.0723-001	1.6520+000	-7.4388-002	-1.3003-001	4.8091-001	9.6296-003
PT7M	2.0214+000	-7.3523+000	-2.4440+001	7.6292-001	4.0757+000	4.1275+000	-1.8152-001	-1.6980-001	2.5876-001	6.8554-003
PT3	7.1386+001	6.8348+002	8.1888+001	-1.4920+002	1.7104+001	-3.6563+002	2.2129+001	3.1827+001	1.4589+001	1.4659+001
PT45	4.7748+001	9.8381+001	4.5164+002	3.5529+002	-8.1570+002	-6.0555+001	1.5917+001	-4.8620+000	-3.3820+001	9.2808+000
TT25H	2.7817+000	-3.6463+000	3.6777+000	9.5503-001	5.6336-001	-1.6770+001	1.0037+000	6.8118-001	6.6373-001	6.6897-001
TT25C	2.9797+000	-5.6562+000	4.4712+000	1.2705+000	7.1984-001	4.6765+000	-1.8760+001	8.4402-001	8.2127-001	8.2661-001
TT3	-2.0288+000	1.8602+000	-2.3261+000	4.0624+000	-3.6696-001	1.7402+001	-6.4282-001	-2.0430+001	-4.2805-001	-4.3231-001
TT4PHI	-3.8464-002	-1.8733-001	-5.0186-002	-2.5086-002	-6.6902-003	1.7729-001	-1.6725-002	4.0859+000	-5.0010+001	-1.1711-002
TT4PLO	-5.2183-003	-2.5087-002	-6.6234-003	-3.4116-003	-1.0036-003	2.3682-002	-2.2078-003	5.4467-001	-6.0012+000	-6.6830-001
TT4	-1.3925+001	-1.2664+002	-1.5940+001	5.7763+000	-2.5323+000	7.1849+001	-4.4207+000	1.8485+001	-2.9621+000	-2.9707+000
TT45HI	8.7116-002	-1.2716+000	8.9285-002	-1.2490+001	1.1893+001	-3.1139-001	3.2667-002	8.1108+000	-1.1631+001	-1.2586+000
TT45LO	3.4488-002	-5.0878-001	3.5277-002	-4.9974+000	4.7576+000	-1.2466-001	1.2542-002	3.2447+000	-4.6520+000	-5.0322-001
TT5	1.4773-001	-1.4390+000	4.1413+000	-5.3870+000	7.3885-001	3.5591-001	3.3582-002	3.4770+000	-5.0694+000	-5.7582-001
TT6C	-3.1366-002	6.8123-001	1.0804-001	-2.4400-002	1.7425-002	-3.4152-001	1.9902+001	1.3765-001	1.9167-002	1.3940-002
TT7M	-1.0702+001	4.7484+001	1.7015+000	-7.4345-002	1.8772+001	-2.3401+001	2.8221+000	1.2611+000	2.8448+000	1.9414+000

F-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	-8.4412-001	3.6222-001	-2.8481-001	-3.7123-001	-4.3950-001	-3.6735-001
SNCOM	-2.7867-001	-4.9748-002	-4.9216-002	-4.7081-002	-5.5104-002	-4.9748-002
PT7M	-1.2232+000	-1.4649-002	-1.8849-002	1.1890+000	5.6791-001	-3.1630-002
PT3	5.0533+001	1.4728+001	1.4659+001	1.4100+001	1.6473+001	1.4733+001
PT45	1.3685+002	1.4810+001	1.4809+001	1.7021+001	1.9232+001	1.4808+001
TT25H	6.9672-001	6.7931-001	6.6901-001	6.4642-001	7.5048-001	6.6903-001
TT25C	8.7198-001	8.3884-001	8.3708-001	8.0917-001	9.2621-001	8.3701-001
TT3	-4.5168-001	-4.3458-001	-4.3237-001	-4.1731-001	-4.8067-001	-4.3134-001
TT4PHI	4.5867+001	-5.0177-003	-1.1709-002	-1.3381-002	-1.0036-002	-1.0037-002
TT4PLO	6.1155+000	-8.0254-004	-1.6052-003	-1.8060-003	-1.4050-003	-1.4051-003
TT4	-5.0890+001	-2.9866+000	-2.9682+000	-2.8662+000	-3.3129+000	-2.9811+000
TT45HI	5.8444+001	-4.9950+001	4.1378-002	2.3948-002	2.3955-002	3.4842-002
TT45LO	2.3379+001	-1.7982+001	-1.9840+000	9.4037-003	9.4074-003	1.4113-002
TT5	2.5270+001	-1.3049+000	-1.6031-001	-2.0000+001	1.8466-002	-1.6786-002
TT6C	5.5757-002	2.0905-002	1.3939-002	2.0902-002	-1.9980+001	1.9165-002
TT7M	-3.2517+000	1.8331+000	1.8442+000	3.4552+001	1.9679+001	-4.8170+001

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G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	1.4349+000	-1.1511-001	6.8480-002	-1.1273-002	-1.8791-002
SNCOM	1.1433-001	-2.1547-002	7.7745-003	1.3275-001	-1.1582-004
PT7M	-2.6169-002	-3.6195+000	-9.2592-002	3.0341-001	4.5668-003
PT3	-4.6744+001	5.1241+000	-2.3312+000	-3.0240+001	-1.6715+000
PT45	-5.6340+001	4.5473+000	-2.0718+000	-9.4639+000	1.1161+000
TT25M	-2.5933+000	2.1266-001	-5.3986-002	-2.4525-002	3.6985-002
TT25C	-3.4892+000	2.5291-001	-8.3508-002	1.9175-002	4.8145-002
TT3	1.7994+000	-1.1399-001	6.7226-002	4.8802-001	-2.9342-002
TT4PHI	1.2930-001	-5.2889-003	1.3738-003	1.7642-002	-4.8796-002
TT4PLO	1.7539-002	-6.9181-004	1.8940-004	2.3524-003	-6.5120-003
TT4	3.0790+001	-1.1924+000	4.5059-001	5.8652+000	3.7438-001
TT45HI	3.2660-001	7.9428-003	-3.5068-003	-3.5865-002	-7.4655-002
TT45LO	1.3232-001	3.2119-003	-1.3923-003	-1.4379-002	-2.9918-002
TT5	2.9494-001	-8.3692-003	-6.5145-003	2.9208-002	-3.2811-002
TT6C	-7.1051-002	5.1419-003	1.2692-003	-3.4575-002	2.0313-003
TT7M	-6.9763+000	5.8734-001	4.4291-001	-2.2761+000	1.3087-001

H-MATRIX

	SNFAN	SNCOM	PT7M	PT3	PT45	TT25H	TT25C	TT3	TT4PHI	TT4PLO
FNMX	4.6336-001	-2.1216+000	4.4051+000	9.7181-002	1.0098+000	1.0492+000	-1.4761-001	-1.6146-001	-4.3483-002	-9.2540-002
WFAN	8.9334-001	2.1102-001	-2.7159-001	-7.1151-002	-4.2821-002	-2.3863-001	-7.4979-002	-5.0698-002	-5.0063-002	-5.0405-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-1.3868+000	5.8901+000	-6.1124+000	-1.5998+000	-9.6314-001	-5.3713+000	-1.6853+000	-1.1419+000	-1.1257+000	-1.1323+000
SMHC	1.3040+001	2.3243+002	1.4922+001	-2.5394+001	2.3723+000	-1.1489+002	4.1414+000	2.8047+000	2.7728+000	2.7825+000
	9.9358-002	-1.6834-002	-5.3172-001	-1.0355-001	-8.4268-002	-1.3633-001	-6.9978-002	-1.0041-001	-9.8537-002	-9.8812-002
	5.2218-002	-3.6325-002	-1.1285-001	-2.0072-002	-1.8000-002	7.2250-003	2.4816-004	-2.1375-002	-2.0951-002	-2.0814-002

H-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	-4.3145-001	-1.0187-001	-1.0006-001	2.2739-001	6.0308-002	-9.7496-002
WFAN	-5.2600-002	-5.0482-002	-5.0432-002	-4.8522-002	-5.6095-002	-5.0440-002
TT4	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-1.1843+000	-1.1361+000	-1.1337+000	-1.0925+000	-1.2618+000	-1.1338+000
SMHC	2.9115+000	2.7948+000	2.7826+000	2.6841+000	3.1044+000	2.7882+000
	-1.0375-001	-9.8660-002	-9.8832-002	-9.5050-002	-1.1043-001	-9.8809-002
	-2.2073-002	-2.1004-002	-2.0820-002	-2.0129-002	-2.3622-002	-2.0821-002

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D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	4.2953-001	-6.1992-002	-1.8964-002	1.0703-001	-7.6925-003
WFAN	2.1540-001	-1.3693-002	-3.4254-002	2.4849-003	-3.4333-003
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	4.5792+000	-3.5661-001	1.0314+000	4.4270-002	-6.4241-002
SMHC	-6.5580+000	1.2107+000	-4.2765-001	-6.3393+000	1.6634-001
	3.8345-001	-3.1530-002	5.2450-003	2.5666-002	-5.3387-003
	8.2378-002	-6.4080-003	-1.8830-003	6.6768-003	-1.1673-003

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-8.27027+002)+J(0.00000)	0.00000	1.00000	1	(-4.57838-003)+J(0.00000)	-.0045784	.00000
			2	(7.65932-004)+J(0.00000)	.0007659	.00000
			3	(-5.02808-003)+J(0.00000)	-.0050281	.00000
			4	(-2.44377-002)+J(0.00000)	-.0244377	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(-5.87166-004)+J(0.00000)	-.0005872	.00000
			7	(-7.53296-004)+J(0.00000)	-.0007533	.00000
			8	(5.38518-004)+J(0.00000)	.0005385	.00000
			9	(-1.86922-004)+J(0.00000)	-.0001869	.00000
			10	(-2.46636-005)+J(0.00000)	-.0000247	.00000
			11	(3.23790-003)+J(0.00000)	.0032379	.00000
			12	(-1.59454-002)+J(0.00000)	-.0159454	.00000
			13	(-6.35576-003)+J(0.00000)	-.0063558	.00000
			14	(-1.18286-003)+J(0.00000)	-.0011829	.00000
			15	(-3.33860-006)+J(0.00000)	-.0000033	.00000
			16	(-2.40996-002)+J(0.00000)	-.0240996	.00000
(-1.45945+002)+J(0.00000)	0.00000	1.00000	1	(-1.14799-002)+J(0.00000)	-.0114799	.00000
			2	(-5.49950-003)+J(0.00000)	-.0054995	.00000
			3	(-2.41487-002)+J(0.00000)	-.0241487	.00000
			4	(-1.00000+000)+J(0.00000)	-1.0000000	.00000
			5	(5.04628-001)+J(0.00000)	.5046277	.00000
			6	(-8.84310-003)+J(0.00000)	-.0088431	.00000
			7	(-1.17910-002)+J(0.00000)	-.0117910	.00000
			8	(-3.00947-002)+J(0.00000)	-.0300947	.00000
			9	(2.32204-002)+J(0.00000)	.0232204	.00000
			10	(-3.00453-003)+J(0.00000)	-.0030045	.00000
			11	(-4.52831-002)+J(0.00000)	-.0452831	.00000
			12	(1.00512-001)+J(0.00000)	.1005120	.00000
			13	(-3.93756-002)+J(0.00000)	-.0393756	.00000
			14	(5.25187-002)+J(0.00000)	.0525187	.00000
			15	(2.04791-003)+J(0.00000)	.0020479	.00000
			16	(-1.19518-001)+J(0.00000)	-.1195182	.00000

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(-5.05263+001)+J(1.89791+001)	5.39733+001	.93614	1	(-1.37110-002)+J(-9.61287-003)	.0167452	-144.96554
			2	(-9.88474-003)+J(2.84046-003)	.0102848	163.96754
			3	(-4.07724-002)+J(1.61640-004)	.0407727	179.77286
			4	(3.75059-001)+J(-1.32081-001)	.3976362	-19.40026
			5	(1.74879-001)+J(-2.56138-002)	.1767450	-8.33262
			6	(-4.47126-002)+J(6.69160-005)	.0447127	179.91425
			7	(-5.62418-002)+J(6.24412-005)	.0562418	179.93639
			8	(-1.27542-003)+J(1.41813-003)	.0019073	131.96712
			9	(5.44617-001)+J(-3.62078-001)	.6539940	-33.61714
			10	(6.57101-002)+J(-4.67096-002)	.0806201	-35.40688
			11	(1.44271-001)+J(2.29022-001)	.2706756	57.79141
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(3.78594-001)+J(-8.37815-003)	.3786869	-1.26773
			14	(1.83614-001)+J(-1.59564-001)	.2432585	-40.99139
			15	(2.54479-002)+J(1.59809-002)	.0300497	32.12823
			16	(-4.71763-001)+J(-6.96623-001)	.8413344	-124.10640
(-5.16767+001)+J(0.00000	0.00000	1.00000	1	(9.89451-003)+J(0.00000)	.0098945	.00000
			2	(9.05364-004)+J(0.00000)	.0009054	.00000
			3	(1.78376-003)+J(0.00000)	.0017838	.00000
			4	(2.47551-003)+J(0.00000)	.0024755	.00000
			5	(6.84138-003)+J(0.00000)	.0068414	.00000
			6	(7.14764-004)+J(0.00000)	.0007148	.00000
			7	(7.99637-004)+J(0.00000)	.0007996	.00000
			8	(-1.11566-003)+J(0.00000)	-.0011157	.00000
			9	(-8.05470-002)+J(0.00000)	-.0805470	.00000
			10	(-9.82775-003)+J(0.00000)	-.0098278	.00000
			11	(3.10117-003)+J(0.00000)	.0031012	.00000
			12	(-6.91790-001)+J(0.00000)	-.6917899	.00000
			13	(-2.60039-001)+J(0.00000)	-.2600387	.00000
			14	(-4.46890-002)+J(0.00000)	-.0446890	.00000
			15	(-4.64130-004)+J(0.00000)	-.0004641	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.41888+001)+J(0.00000)	0.00000	1.00000	1	(1.97053-002)+J(0.00000)	.0197053	.00000
			2	(-1.30944-002)+J(0.00000)	-.0130944	.00000
			3	(-8.77174-003)+J(0.00000)	-.0087717	.00000
			4	(3.07629-002)+J(0.00000)	.0307629	.00000
			5	(-2.89539-002)+J(0.00000)	-.0289539	.00000
			6	(-9.35562-003)+J(0.00000)	-.0093556	.00000
			7	(-1.17432-002)+J(0.00000)	-.0117432	.00000
			8	(7.68750-003)+J(0.00000)	.0076875	.00000
			9	(1.00000+000)+J(0.00000)	1.0000000	.00000
			10	(1.20052-001)+J(0.00000)	.1200522	.00000
			11	(1.26135-001)+J(0.00000)	.1261352	.00000
			12	(-8.78545-001)+J(0.00000)	-.8785446	.00000
			13	(-3.26485-001)+J(0.00000)	-.3264854	.00000
			14	(3.85874-002)+J(0.00000)	.0385874	.00000
			15	(9.57024-003)+J(0.00000)	.0095702	.00000
			16	(1.95632-001)+J(0.00000)	.1956317	.00000

(-2.46496+001)+J(3.45418+000)	2.48905+001	.99032	1	(-9.57457-003)+J(-1.57570-002)	.0184379	-121.28454
			2	(1.93061-004)+J(-7.07499-003)	.0070776	-88.43691
			3	(-1.49402-001)+J(-2.13225-001)	.2603572	-125.01803
			4	(1.72280-001)+J(-7.47976-002)	.1878165	-23.46873
			5	(1.17502-002)+J(-1.34526-001)	.1350384	-85.00816
			6	(-5.34119-002)+J(1.01015-002)	.0543587	169.29047
			7	(-6.39327-002)+J(7.23015-003)	.0643402	173.54783
			8	(5.17186-002)+J(3.94730-002)	.0650609	37.35182
			9	(-1.33881-001)+J(2.83175-001)	.3132288	115.30414
			10	(-1.37243-002)+J(3.15294-002)	.0343869	113.52273
			11	(-9.94693-002)+J(1.42704-001)	.1739499	124.87775
			12	(-1.99678-001)+J(2.11270-001)	.2906997	133.38422
			13	(-6.78740-002)+J(7.51478-002)	.1012623	132.08856
			14	(5.56030-001)+J(1.04316-001)	.5657310	10.62570
			15	(1.87206-001)+J(1.08613-001)	.2164324	30.12133
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.73144+000)+J(1.98987+000)	5.13285+000	.92180	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-2.87613-002)+J(8.27176-003)	.0299271	163.95471
			3	(2.31773-001)+J(-1.00901-001)	.2527838	-23.52558
			4	(-1.84941-001)+J(2.40026-001)	.3030110	127.61436
			5	(1.35810-001)+J(-8.74743-003)	.1360918	-3.68528
			6	(4.07710-001)+J(-2.63060-001)	.4852087	-32.83065
			7	(4.91449-001)+J(-3.34919-001)	.5947211	-34.27411
			8	(1.46062-001)+J(-1.46705-001)	.2070184	-45.12591
			9	(2.03953-001)+J(-2.77621-001)	.3444859	-53.69728
			10	(-1.17381-002)+J(-1.66359-002)	.0203602	-125.20643
			11	(2.00146-001)+J(-2.51636-001)	.3215264	-51.50195
			12	(3.04947-001)+J(-3.61599-001)	.4730184	-49.85814
			13	(-4.09182-002)+J(-1.04555-001)	.1122764	-111.37324
			14	(3.63620-001)+J(-4.91134-001)	.6110912	-53.48490
			15	(5.67752-001)+J(-5.10597-001)	.7635784	-41.96601
			16	(1.37869-001)+J(-5.31478-001)	.5490690	-75.45765
(-6.66340-001)+J(2.17310-001)	7.00880-001	.95072	1	(8.41504-001)+J(-2.19456-001)	.8696496	-14.61660
			2	(2.19409-001)+J(2.81252-003)	.2194273	.73441
			3	(1.32463-001)+J(-2.79713-002)	.1353843	-11.92358
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(4.98770-001)+J(-1.88616-002)	.4991265	-2.16560
			6	(1.27033-001)+J(-1.47916-002)	.1278916	-6.64152
			7	(1.32466-001)+J(-1.33961-002)	.1331414	-5.77462
			8	(2.72505-001)+J(-6.87132-003)	.2725920	-1.44443
			9	(-3.08712-001)+J(-4.53989-003)	.3087453	-179.15747
			10	(-5.46432-002)+J(8.20850-001)	.8226672	93.80850
			11	(-3.54815-001)+J(-5.67660-003)	.3548607	-179.08342
			12	(-4.40337-001)+J(-3.07545-002)	.4414095	-176.00477
			13	(-5.66968-001)+J(2.39490-002)	.5674734	177.58123
			14	(-5.36813-001)+J(-3.29098-002)	.5378205	-176.49181
			15	(1.39313-001)+J(-1.43027-002)	.1400448	-5.86179
			16	(-1.85388-001)+J(5.44989-002)	.1932328	163.61816

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(-1.99516+001)+J(0.00000	) 0.00000	1.00000	1	(-2.69940-003)+J(0.00000	)	-.0026994	.00000
			2	(-1.24161-003)+J(0.00000	)	-.0012416	.00000
			3	(-7.61393-002)+J(0.00000	)	-.0761393	.00000
			4	(-1.61053-002)+J(0.00000	)	-.0161053	.00000
			5	(-4.05416-002)+J(0.00000	)	-.0405416	.0000(
			6	(3.79727-003)+J(0.00000	)	.0037973	.0000(
			7	(2.65048-003)+J(0.00000	)	.0026505	.0000(
			8	(3.32320-004)+J(0.00000	)	.0003323	.0000(
			9	(1.90220-002)+J(0.00000	)	.0190220	.0000(
			10	(1.96869-003)+J(0.00000	)	.0019687	.0000(
			11	(1.23328-002)+J(0.00000	)	.0123328	.0000(
			12	(7.25764-003)+J(0.00000	)	.0072576	.0000(
			13	(2.42045-003)+J(0.00000	)	.0024205	.00000
			14	(-6.25673-001)+J(0.00000	)	-.6256734	.00000
			15	(1.00000+000)+J(0.00000	)	1.0000000	.00000
			16	(-1.02920-001)+J(0.00000	)	-.1029202	.00000
(-2.01045+001)+J(0.00000	) 0.00000	1.00000	1	(-3.45312-003)+J(0.00000	)	-.0034531	.00000
			2	(-1.60868-003)+J(0.00000	)	-.0016087	.00000
			3	(-8.11269-002)+J(0.00000	)	-.0811269	.00000
			4	(-1.43408-002)+J(0.00000	)	-.0143408	.00000
			5	(-4.18898-002)+J(0.00000	)	-.0418898	.00000
			6	(3.30452-003)+J(0.00000	)	.0033045	.00000
			7	(-5.09444-003)+J(0.00000	)	-.0050944	.00000
			8	(7.72236-003)+J(0.00000	)	.0077224	.00000
			9	(3.06583-002)+J(0.00000	)	.0306583	.00000
			10	(3.17886-003)+J(0.00000	)	.0031789	.00000
			11	(1.91925-002)+J(0.00000	)	.0191925	.00000
			12	(1.66741-002)+J(0.00000	)	.0168741	.00000
			13	(5.63376-003)+J(0.00000	)	.0056338	.00000
			14	(-6.25307-001)+J(0.00000	)	-.6253069	.00000
			15	(1.00000+000)+J(0.00000	)	1.0000000	.00000
			16	(-1.03300-001)+J(0.00000	)	-.1033004	.00000
(-2.01565+000)+J(0.00000	) 0.00000	1.00000	1	(-2.94984-001)+J(0.00000	)	-.2949839	.00000
			2	(3.58763-003)+J(0.00000	)	.0035876	.00000
			3	(-3.79941-002)+J(0.00000	)	-.0379941	.00000
			4	(8.10235-004)+J(0.00000	)	.0008102	.00000
			5	(-1.89081-002)+J(0.00000	)	-.0189081	.00000
			6	(-2.30051-002)+J(0.00000	)	-.0230051	.00000
			7	(-2.12910-002)+J(0.00000	)	-.0212910	.00000
			8	(-6.27963-003)+J(0.00000	)	-.0062796	.00000
			9	(-7.59232-003)+J(0.00000	)	-.0075923	.00000
			10	(2.25537-003)+J(0.00000	)	.0022554	.00000
			11	(-7.32209-003)+J(0.00000	)	-.0073221	.00000
			12	(-1.27808-002)+J(0.00000	)	-.0127808	.00000
			13	(1.00000+000)+J(0.00000	)	1.0000000	.00000
			14	(-3.04126-002)+J(0.00000	)	-.0304126	.00000
			15	(-2.20121-002)+J(0.00000	)	-.0220121	.00000
			16	(8.06298-002)+J(0.00000	)	.0806298	.00000

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(-2.11676+001)+J( 0.00000    ) 0.00000      1.00000   1  (-2.34137-002)+J( 0.00000    )  -.0234137     .00000
                                                      2  (-8.18840-003)+J( 0.00000    )  -.0081884     .00000
                                                      3  (-1.34186-001)+J( 0.00000    )  -.1341855     .00000
                                                      4  ( 1.48089-001)+J( 0.00000    )   .1480885     .00000
                                                      5  ( 7.76088-003)+J( 0.00000    )   .0077609     .00000
                                                      6  (-4.64699-002)+J( 0.00000    )  -.0464699     .00000
                                                      7  (-6.04876-002)+J( 0.00000    )  -.0604876     .00000
                                                      8  ( 2.04606-001)+J( 0.00000    )   .2046056     .00000
                                                      9  ( 1.96667-001)+J( 0.00000    )   .1966672     .00000
                                                     10  ( 2.06839-002)+J( 0.00000    )   .0206839     .00000
                                                     11  ( 1.05484-001)+J( 0.00000    )   .1054842     .00000
                                                     12  ( 1.30822-001)+J( 0.00000    )   .1308222     .00000
                                                     13  ( 4.41457-002)+J( 0.00000    )   .0441457     .00000
                                                     14  (-7.34331-001)+J( 0.00000    )  -.7343310     .00000
                                                     15  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                     16  (-1.54542-001)+J( 0.00000    )  -.1545421     .00000
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F100 LINEAR MODEL 20/0/0K HP/PLD 1/30/76

CASE 7

**** THE MATRICES IN FINAL FORM ****

F-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	FTIT	PT3	PT45	TT25H	TT25C	TT3
SNFAN	-2.3362+000	2.6514+000	-5.0939+000	1.4255+000	0.0000	-4.5957-001	3.7333+000	-2.1423+000	-5.3365-001	-7.2282-001
SNCOM	-2.4132-001	-3.9334+000	-2.7665-001	1.1459-001	0.0000	1.0675+000	-6.0724-001	1.6523+000	-7.4419-002	-1.2219-001
PT7M	2.0214+000	-7.3526+000	-2.4440+001	-2.5989-002	0.0000	7.6288-001	4.0757+000	4.1277+000	-1.8154-001	-1.6422-001
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FTIT	0.0000	0.0000	0.0000	0.0000	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	7.1272+001	6.8293+002	8.1742+001	-4.6360+001	0.0000	-1.4927+002	1.7082+001	-3.6511+002	2.2081+001	4.3774+001
PT45	4.7676+001	9.8032+001	4.5155+002	-5.6096+001	0.0000	3.5524+002	-8.1571+002	-6.0226+001	1.5886+001	2.7019+000
TT25H	2.7764+000	-3.6715+000	3.6711+000	-2.5757+000	0.0000	9.5161-001	5.6236-001	-1.6746+001	1.0015+000	1.2264+000
TT25C	2.9732+000	-5.6873+000	4.4630+000	-3.4675+000	0.0000	1.2663+000	7.1860-001	4.7058+000	-1.8763+001	1.5177+000
TT3	-2.0254+000	1.8765+000	-2.3218+000	1.7881+000	0.0000	4.0646+000	-3.6631-001	1.7387+001	-6.4140-001	-2.0782+001
TT4PHI	-3.8373-002	-1.8689-001	-5.0070-002	1.2899-001	0.0000	-2.5026-002	-6.6726-003	1.7688-001	-1.6687-002	4.0764+000
TT4	-1.3902+001	-1.2653+002	-1.5911+001	3.0712+001	0.0000	5.7915+000	-2.5278+000	7.1744+001	-4.4109+000	1.6064+001
TT45HI	9.6943-002	-1.2244+000	1.0176-001	2.9557-001	0.0000	-1.2484+001	1.1894+001	-3.5599-001	3.6825-002	7.0851+000
TT45LO	3.8417-002	-4.8989-001	4.0264-002	1.1912-001	0.0000	-4.9948+000	4.7584+000	-1.4249-001	1.4205-002	2.8346+000
TT5	1.5222-001	-1.4173+000	4.1470+000	2.7982-001	0.0000	-5.3840+000	7.3972-001	3.3550-001	-3.1680-002	3.0077+000
TT6C	-3.1475-002	6.8070-001	1.0790-001	-7.0685-002	0.0000	-2.4471-002	1.7404-002	-3.4103-001	1.9902+001	1.4901-001
TT7M	-1.0718+001	4.7411+001	1.6823+000	-6.9253+000	0.0000	-8.4256-002	1.8769+001	-2.3332+001	2.8157+000	2.8433+000

F-MATRIX

	TT4PHI	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	2.9236+000	-4.0992+000	3.6264-001	-2.8396-001	-3.7027-001	-4.3875-001	-3.6660-001
SNCOM	3.9444-001	-1.9055-001	-4.9760-002	-4.9239-002	-4.7107-002	-5.5124-002	-4.9769-002
PT7M	1.9720-001	-1.1604+000	-1.4657-002	-1.8666-002	1.1889+000	5.6790-001	-3.1644-002
WFCOM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FTIT	0.0000	0.0000	1.2895-001	1.4328-002	0.0000	0.0000	0.0000
PT3	-1.1705+002	1.2467+002	1.4711+001	1.4624+001	1.4060+001	1.6443+001	1.4703+001
PT45	-1.1716+002	2.2378+002	1.4799+001	1.4787+001	1.6995+001	1.9212+001	1.4788+001
TT25H	-5.3435+000	6.8184+000	6.7851-001	6.6740-001	6.4462-001	7.4907-001	6.6762-001
TT25C	-6.6015+000	8.4362+000	8.3785-001	8.3509-001	8.0694-001	9.2447-001	8.3527-001
TT3	3.4540+000	-4.4077+000	-4.3406-001	-4.3133-001	-4.1614-001	-4.7976-001	-4.3043-001
TT4PHI	-4.9905+001	4.5760+001	-5.0037-003	-1.1681-002	-1.3349-002	-1.0012-002	-1.0013-002
TT4	2.3714+001	-7.8074+001	-2.9830+000	-2.9610+000	-2.8582+000	-3.3067+000	-2.9748+000
TT45HI	-3.2879-001	4.6927+001	-4.9946+001	4.4401-002	2.7349-002	2.6601-002	3.7488-002
TT45LO	-1.3320-001	1.8774+001	-1.7981+001	-1.9828+000	1.0764-002	1.0465-002	1.5171-002
TT5	1.0130-001	2.0000+001	-1.3042+000	-1.5692-001	-1.9998+001	1.9677-002	-1.5575-002
TT6C	-1.0601-001	1.8332-001	2.0888-002	1.3905-002	2.0664-002	-1.9980+001	1.9136-002
TT7M	-1.4588+001	1.4513+001	1.8307+000	1.8395+000	3.4546+001	1.9675+001	-4.8174+001

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	0.0000	-1.1474-001	6.8380-002	-1.2525-002	-1.5325-002
SNCOM	0.0000	-2.1557-002	7.7772-003	1.3279-001	-2.0965-004
PT7M	0.0000	-3.6195+000	-9.2590-002	3.0343-001	4.5000-003
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	0.0000	5.1089+000	-2.3271+000	-3.0188+001	-1.8144+000
PT45	0.0000	4.5377+000	-2.0692+000	-9.4313+000	1.0257+000
TT25H	0.0000	2.1197-001	-5.3796-002	-2.2171-002	3.0467-002
TT25C	0.0000	2.5206-001	-8.3274-002	2.2085-002	4.0090-002
TT3	0.0000	-1.1354-001	6.7104-002	4.8650-001	-2.5129-002
TT4PHI	0.0000	-5.2768-003	1.3705-003	1.7601-002	-4.8682-002
TT4	0.0000	-1.1893+000	4.4975-001	5.8548+000	4.0333-001
TT45HI	0.0000	9.2457-003	-3.8635-003	-4.0295-002	-6.2391-002
TT45LO	0.0000	3.7328-003	-1.5349-003	-1.6151-002	-2.5015-002
TT5	0.0000	-7.7731-003	-6.6777-003	2.7181-002	-2.7200-002
TT6C	0.0000	5.1275-003	1.2732-003	-3.4526-002	1.8954-003
TT7M	0.0000	5.8534-001	4.4346-001	-2.2693+000	1.1195-001

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	FTIT	PT3	PT45	TT25H	TT25C	TT3
FNMX	4.6458-001	-2.1182+000	4.4660+000	4.2710-001	0.0000	9.7654-002	1.0099+000	1.0459+000	-1.4730-001	-2.3688-001
WFAN	8.9374-001	2.1291-001	-2.7109-001	2.1708-001	0.0000	-7.0894-002	-4.2745-002	-2.4042-001	-7.4813-002	-9.1778-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-1.3780+000	5.9326+000	-6.1012+000	4.5495+000	0.0000	-1.5941+000	-9.6144-001	-5.4114+000	-1.6815+000	-2.0647+000
SMHC	1.3018+001	-2.3232+002	1.4894+001	-6.4849+000	0.0000	-2.5408+001	2.3681+000	-1.1479+002	4.1322+000	5.0724+000
DP25QT	1.0013-001	-1.3125-002	-5.3074-001	3.8086-001	0.0000	-1.0304-001	-8.4120-002	-1.3983-001	-6.9652-002	-1.8094-001
DP25SC	5.2380-002	-3.5544-002	-1.1264-001	8.1832-002	0.0000	-1.9966-002	-1.7969-002	6.4875-003	3.1692-004	-3.8338-002

H-MATRIX

	TT4PHI	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	7.8750-001	-1.2783+000	-1.0175-001	-9.9834-002	2.2764-001	6.0502-002	-9.7301-002
WFAN	4.0256-001	-5.1385-001	-5.0422-002	-5.0311-002	-4.8386-002	-5.5989-002	-5.0334-002
TT4	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	9.0420+000	-1.1546+001	-1.1347+000	-1.1309+000	-1.0894+000	-1.2595+000	-1.1314+000
SMHC	-2.2213+001	2.8373+001	2.7915+000	2.7759+000	2.6766+000	3.0985+000	2.7824+000
DP25QT	7.8877-001	-1.0080+000	-9.8541-002	-9.8595-002	-9.4783-002	-1.1022-001	-9.8602-002
DP25SC	1.6595-001	-2.1254-001	-2.0979-002	-2.0770-002	-2.0073-002	-2.3579-002	-2.0777-002

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMY	0.0000	-6.1596-002	-1.8990-002	1.0670-001	-6.7908-003
WFAN	0.0000	-1.3641-002	-3.4269-002	2.3074-003	-2.9422-003
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	-3.5544-001	1.0311+000	4.0285-002	-5.3208-002
SMHC	0.0000	1.2079+000	-4.2686-001	-6.3295+000	1.3923-001
DP25QT	0.0000	-3.1428-002	5.2170-003	2.5316-002	-4.3759-003
DP25SC	0.0000	-6.3865-003	-1.8889-003	6.6035-003	-9.6448-004

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(0.00000)+J(0.00000)	.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
(-8.26967+002)+J(0.00000)	0.00000	1.00000	1	(-4.56539-003)+J(0.00000)	-.0045654	.00000
			2	(7.66645-004)+J(0.00000)	.0007666	.00000
			3	(-5.02777-003)+J(-0.00000)	-.0050278	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.59271-006)+J(0.00000)	.0000026	.00000
			6	(-2.51521-002)+J(-0.00000)	-.0251521	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(-6.12719-004)+J(0.00000)	-.0006127	.00000
			9	(-7.84764-004)+J(-0.00000)	-.0007848	.00000
			10	(5.59808-004)+J(0.00000)	.0005598	.00000
			11	(-1.94212-004)+J(0.00000)	-.0001942	.00000
			12	(-3.36705-003)+J(-0.00000)	-.0033671	.00000
			13	(-1.59167-002)+J(0.00000)	-.0159167	.00000
			14	(-6.34433-003)+J(0.00000)	-.0063443	.00000
			15	(-1.16916-003)+J(-0.00000)	-.0011692	.00000
			16	(-3.15621-006)+J(0.00000)	-.0000032	.00000
			17	(-2.41815-002)+J(0.00000)	-.0241815	.00000

F100 LINEAR MODEL 20/0/0K HP/PLD 1/30/76

(-1.60813+002)+J(0.00000)	0.00000	1.00000	1	(-1.21372-002)+J(0.00000)	-.0121372	.00000
			2	(-5.03031-003)+J(0.00000)	-.0050303	.00000
			3	(-2.15929-002)+J(0.00000)	-.0215929	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-7.39382-005)+J(0.00000)	.0000739	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(5.00975-001)+J(0.00000)	.5009746	.00000
			8	(-3.90078-003)+J(0.00000)	-.0039008	.00000
			9	(-5.61340-003)+J(0.00000)	-.0056134	.00000
			10	(-3.01923-002)+J(0.00000)	-.0301923	.00000
			11	(2.80388-002)+J(0.00000)	.0280388	.00000
			12	(-6.46758-002)+J(0.00000)	-.0646758	.00000
			13	(8.82138-002)+J(0.00000)	.0882138	.00000
			14	(3.46280-002)+J(0.00000)	.0346280	.00000
			15	(4.68669-002)+J(0.00000)	.0468669	.00000
			16	(1.05927-003)+J(0.00000)	.0010593	.00000
			17	(-8.59446-002)+J(0 00000)	.0859446	.00000
(-8.44662+001)+J(0.00000)	0.00000	1.00000	1	(-8.24416-003)+J(0.00000)	-.0082442	.00000
			2	(-7.34545-003)+J(0.00000)	-.0073455	.00000
			3	(-4.39256-002)+J(0.00000)	-.0439256	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(8.93800-005)+J(0.00000)	.0000894	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(5.38581-001)+J(0.00000)	.5385810	.00000
			8	(-4.50373-002)+J(0.00000)	-.0450373	.00000
			9	(-5.69612-002)+J(0.00000)	-.0569612	.00000
			10	(-2.98701-002)+J(0.00000)	-.0298701	.00000
			11	(-2.25576-001)+J(0.00000)	-.2255758	.00000
			12	(1.73622-001)+J(0.00000)	.1736216	.00000
			13	(-5.59738-002)+J(0.00000)	-.0559738	.00000
			14	(-2.15766-002)+J(0.00000)	-.0215766	.00000
			15	(2.68026-002)+J(0.00000)	.0268026	.00000
			16	(1.70834-002)+J(0.00000)	.0170834	.00000
			17	(-4.80178-001)+J(0.00000)	-.4801783	.00000

F390 LINEAR MODEL 20/0/0K HP/FLD 1/30/76

(-4.97729+001)+J(0.00000)	0.00000	1.00000	1	(-2.05857-003)+J(0.00000)	-.0020586	.00000
			2	(-1.41916-006)+J(0.00000)	-.0000014	.00000
			3	(4.06970-005)+J(0.00000)	.0000407	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-3.56219-004)+J(0.00000)	-.0003562	.00000
			6	(3.80360-004)+J(0.00000)	.0003804	.00000
			7	(4.87892-004)+J(0.00000)	.0004879	.00000
			8	(1.31366-005)+J(0.00000)	.0000131	.00000
			9	(-3.86436-004)+J(0.00000)	-.0003864	.00000
			10	(-1.50560-004)+J(0.00000)	-.0001506	.00000
			11	(1.48382-001)+J(0.00000)	.1483815	.00000
			12	(6.87184-004)+J(0.00000)	.0006872	.00000
			13	(1.31329-001)+J(0.00000)	.1313286	.00000
			14	(4.92402-002)+J(0.00000)	.0492402	.00000
			15	(5.64834-003)+J(0.00000)	.0056463	.00000
			16	(1.92269-005)+J(0.00000)	.0000192	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.99660+001)+J(0.00000)	0.00000	1.00000	1	(-3.01015-004)+J(0.00000)	-.0003010	.00000
			2	(5.48967-006)+J(0.00000)	.0000055	.00000
			3	(1.87623-004)+J(0.00000)	.0001876	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-5.16329-005)+J(0.00000)	-.0000516	.00000
			6	(8.47794-005)+J(0.00000)	.0000848	.00000
			7	(2.77495-004)+J(0.00000)	.0002775	.00000
			8	(6.22571-005)+J(0.00000)	.0000623	.00000
			9	(-2.80591-004)+J(0.00000)	.0002806	.00000
			10	(-1.36683-004)+J(0.00000)	-.0001367	.00000
			11	(1.28768-001)+J(0.00000)	.1287676	.00000
			12	(6.28109-005)+J(0.00000)	.0000628	.00000
			13	(1.91097-002)+J(0.00000)	.0191097	.00000
			14	(7.16753-003)+J(0.00000)	.0071675	.00000
			15	(9.09183-004)+J(0.00000)	.0009092	.00000
			16	(-1.41642-005)+J(0.00000)	-.0000142	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

(-4.97729+001)+J(0.00000)	0.00000	1.00000	1	(-2.05857-003)+J(0.00000)	-.0020586	.00000
			2	(-1.41916-006)+J(0.00000)	-.0000014	.00000
			3	(4.06970-005)+J(0.00000)	.0000407	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-3.56219-004)+J(0.00000)	-.0003562	.00000
			6	(3.80360-004)+J(0.00000)	.0003804	.00000
			7	(4.87892-004)+J(0.00000)	.0004879	.00000
			8	(1.31366-005)+J(0.00000)	.0000131	.00000
			9	(-3.86436-004)+J(0.00000)	-.0003864	.00000
			10	(-1.50560-004)+J(0.00000)	-.0001506	.00000
			11	(1.48382-001)+J(0.00000)	.1483815	.00000
			12	(6.87184-004)+J(0.00000)	.0006872	.00000
			13	(1.31329-001)+J(0.00000)	.1313286	.00000
			14	(4.92402-002)+J(0.00000)	.0492402	.00000
			15	(5.64834-003)+J(0.00000)	.0056483	.00000
			16	(1.92269-005)+J(0.00000)	.0000192	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.99660+001)+J(0.00000)	0.00000	1.00000	1	(-3.01015-004)+J(0.00000)	-.0003010	.00000
			2	(5.48967-006)+J(0.00000)	.0000055	.00000
			3	(1.87623-004)+J(0.00000)	.0001876	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-5.16329-005)+J(0.00000)	-.0000516	.00000
			6	(8.47794-005)+J(0.00000)	.0000848	.00000
			7	(2.77495-004)+J(0.00000)	.0002775	.00000
			8	(6.22571-005)+J(0.00000)	.0000623	.00000
			9	(-2.80591-004)+J(0.00000)	-.0002806	.00000
			10	(-1.36683-004)+J(0.00000)	-.0001367	.00000
			11	(1.28768-001)+J(0.00000)	.1287676	.00000
			12	(6.28109-005)+J(0.00000)	.0000628	.00000
			13	(1.91097-002)+J(0.00000)	.0191097	.00000
			14	(7.16753-003)+J(0.00000)	.0071675	.00000
			15	(9.09183-004)+J(0.00000)	.0009092	.00000
			16	(-1.41642-005)+J(0.00000)	-.0000142	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000

F100 LINEAR MODEL 20/0/0K HP/BLD 1/30/76

(-7.19412-001)+J(0.00000)	0.00000	1.00000	1	(9.13147-001)+J(0.00000)	.9131474	.00000
			2	(2.16544-001)+J(0.00000)	.2185436	.00000
			3	(1.42690-001)+J(0.00000)	.1426896	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.35817-001)+J(0.00000)	.1358166	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(5.06279-001)+J(0.00000)	.5062792	.00000
			8	(1.35462-001)+J(0.00000)	.1354617	.00000
			9	(1.41374-001)+J(0.00000)	.1413743	.00000
			10	(2.75937-001)+J(0.00000)	.2759367	.00000
			11	(-3.06337-001)+J(0.00000)	-.3063369	.00000
			12	(-3.52246-001)+J(0.00000)	-.3522455	.00000
			13	(-4.30381-001)+J(0.00000)	-.4303811	.00000
			14	(-5.76077-001)+J(0.00000)	-.5760765	.00000
			15	(-5.25689-001)+J(0.00000)	-.5256891	.00000
			16	(1.48716-001)+J(0.00000)	.1487163	.00000
			17	(-1.99575-001)+J(0.00000)	-.1995750	.00000
(-2.01574+000)+J(0.00000)	0.00000	1.00000	1	(-2.91327-001)+J(0.00000)	-.2913268	.00000
			2	(3.81992-003)+J(0.00000)	.0038199	.00000
			3	(-3.74032-002)+J(0.00000)	-.0374032	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-7.17630-003)+J(0.00000)	-.0071763	.00000
			6	(1.96306-003)+J(0.00000)	.0019631	.00000
			7	(-1.79807-002)+J(0.00000)	-.0179807	.00000
			8	(-2.23738-002)+J(0.00000)	-.0223738	.00000
			9	(-2.05907-002)+J(0.00000)	-.0205907	.00000
			10	(-5.75483-003)+J(0.00000)	-.0057548	.00000
			11	(-7.79656-003)+J(0.00000)	-.0077966	.00000
			12	(-7.58106-003)+J(0.00000)	-.0075811	.00000
			13	(-1.28484-002)+J(0.00000)	-.0128484	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(-3.05376-002)+J(0.00000)	-.0305376	.00000
			16	(-2.12462-002)+J(0.00000)	-.0212462	.00000
			17	(8.00991-002)+J(0.00000)	.0800991	00000

F100 LINEAR MODEL 837.9/30K 2/18/76

CASE 8

G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	0.0000	-1.9696-001	-6.0036-003	5.0892-004	-6.1482-002
SNCOM	0.0000	-7.9120-002	4.5182-004	-8.0327-003	6.0167-001
PT7M	0.0000	-5.7598+000	4.4296-003	-3.0873-002	-5.1668+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	0.0000	1.0069+001	-8.7415-002	1.6771-001	-2.5908+002
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT45	0.0000	-1.7549+001	2.8355-001	8.1839-001	1.8603+002
TT25H	0.0000	8.1865-001	1.0602-002	-9.9947-003	-1.8875+000
TT25C	0.0000	1.6932+000	1.2177-002	-1.9459-002	-4.3247+000
TT3	0.0000	-2.2200-001	3.2209-003	4.3465-002	3.6583+000
TT4PHI	0.0000	-8.5244-003	1.2724-004	-4.9796-005	-2.5625+000
TT4PLO	0.0000	-1.1786-003	1.7004-005	-5.5367-006	-3.4169-001
TT4	0.0000	-1.9484+000	1.8883-002	-1.3887-002	4.5346+001
TT45HI	0.0000	-1.4207-002	3.8204-004	-3.2163-004	-3.1511+000
TT45LO	0.0000	-5.5068-003	1.5189-004	-1.3417-004	-1.2612+000
TT5	0.0000	1.4786-001	3.0039-004	-5.3606-004	-1.0848+000
TT6C	0.0000	4.3109-002	-1.5189-003	3.3448-004	-2.8728-001
TT7M	0.0000	1.4459+000	-8.3168-002	-6.2025-003	-1.2951+001

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
FNMX	1.3356-001	-9.4179-001	-2.9354-001	1.5242-001	1.7882-001	0.0000	9.8684-001	8.2433-001	3.2341-002	-1.1159-001
WFAN	6.4261-001	8.7883-004	-2.8635-003	5.9545-003	5.0213-004	0.0000	7.0304-004	3.2642-004	8.7877-004	7.0305-004
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	1.2019+001	1.0189+000	-3.4753+000	-3.4264+000	5.4904-001	0.0000	6.4314-001	1.9917-001	9.9227-001	5.8901-001
SMHC	4.6162-001	8.5247+000	3.5764+000	4.1197+000	-6.3923+000	0.0000	-6.7607-001	-5.7289+000	-1.0511+000	-6.1813-001
DP25QT	2.5233-001	-2.6360-001	-5.4935-001	-5.9262-001	1.3313-001	0.0000	1.0343-001	4.2660-001	2.5272-001	9.4249-002
DP25SC	1.1754-001	8.3366-002	-1.4205-001	-1.4845-001	1.8636-002	0.0000	2.6376-002	5.2560-002	8.1500-002	2.4190-002

H-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	1.0458-001	-1.2739-002	-6.3744-001	-2.8165-002	-2.7491-002	6.1548-001	1.3395-001	-2.7232-002
WFAN	7.0301-004	7.0305-004	5.0218-004	7.0307-004	7.0312-004	7.0314-004	5.0217-004	7.0307-004
TT4	0.0000	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	5.9936-001	5.9563-001	5.6359-001	5.9528-001	5.9359-001	5.9233-001	5.2165-001	5.9561-001
SMHC	-6.2986-001	-6.2534-001	-5.9582-001	-6.2481-001	-6.2446-001	-6.2153-001	-5.4880-001	-6.2539-001
DP25QT	9.5727-002	9.5370-002	9.0397-002	9.5514-002	9.4751-002	9.4580-002	8.3465-002	9.5368-002
DP25SC	2.4535-002	2.4587-002	2.3344-002	2.4585-002	2.4175-002	2.4260-002	2.1424-002	2.4586-002

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D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	0.0000	6.2582-002	1.3542-003	-2.9477-003	-3.7528-002
WFAN	0.0000	6.1253-003	2.9064-003	9.8651-006	3.8022-003
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	-4.2075-001	2.8443-002	1.4415-002	3.3477+000
SMHC	0.0000	4.7963-001	-4.3756-003	-4.3831-002	-4.1033+000
DP25GT	0.0000	-4.0676-002	2.1110-003	1.2060-003	5.8050-001
DP25SC	0.0000	-7.3165-003	7.7960-004	7.1160-004	1.4300-001

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(0.00000)+J(0.00000)	.0000000	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
			18	(0.00000)+J(0.00000)	.0000000	.00000
(-5.14312+002)+J(0.00000)	0.00000	1.00000	1	(-4.13617-003)+J(0.00000)	-.0041362	.00000
			2	(1.57287-003)+J(0.00000)	.0015729	.00000
			3	(-6.50266-003)+J(0.00000)	-.0065027	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(4.51701-002)+J(0.00000)	.0451701	.00000
			6	(9.10761-006)+J(0.00000)	.0000091	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(1.36257-003)+J(0.00000)	.0013626	.00000
			9	(8.38037-004)+J(0.00000)	.0008380	.00000
			10	(-1.54084-003)+J(0.00000)	-.0015408	.00000
			11	(6.19340-004)+J(0.00000)	.0006193	.00000
			12	(8.18446-005)+J(0.00000)	.0000818	.00000
			13	(-6.72103-003)+J(0.00000)	-.0067210	.00000
			14	(-2.06807-002)+J(0.00000)	-.0206807	.00000
			15	(-8.22166-003)+J(0.00000)	-.0082217	.00000
			16	(-1.92318-003)+J(0.00000)	-.0019232	.00000
			17	(8.81025-005)+J(0.00000)	.0000881	.00000
			18	(-1.27959-002)+J(0.00000)	-.0127959	.00000

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(-2.05741+002)+J(0.00000)	0.00000	1.00000	1	(-1.09568-002)+J(0.00000)	-.0109568	.00000
			2	(-2.42705-003)+J(0.00000)	-.0024270	.00000
			3	(-1.71745-002)+J(0.00000)	-.0171745	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(6.53856-001)+J(0.00000)	.6538556	.00000
			6	(6.60364-006)+J(0.00000)	.0000066	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(5.86734-003)+J(0.00000)	.0058673	.00000
			9	(3.57003-003)+J(0.00000)	.0035700	.00000
			10	(-2.04140-002)+J(0.00000)	-.0204140	.00000
			11	(1.26162-002)+J(0.00000)	.0126162	.00000
			12	(1.64644-003)+J(0.00000)	.0016464	.00000
			13	(-4.22671-002)+J(0.00000)	-.0422671	.00000
			14	(-5.99703-003)+J(0.00000)	-.0059970	.00000
			15	(-2.35639-003)+J(0.00000)	-.0023564	.00000
			16	(1.82117-002)+J(0.00000)	.0182117	.00000
			17	(3.65173-004)+J(0.00000)	.0003652	.00000
			18	(-3.16488-002)+J(0.00000)	-.0316488	.00000
(-6.53550+001)+J(0.00000)	0.00000	1.00000	1	(-7.04941-003)+J(0.00000)	-.0070494	.00000
			2	(-8.31022-003)+J(0.00000)	-.0083102	.00000
			3	(2.42452-002)+J(0.00000)	.0242452	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-2.39612-001)+J(0.00000)	-.2396122	.00000
			6	(-3.47118-003)+J(0.00000)	-.0034712	.00000
			7	(-2.89934-001)+J(0.00000)	-.2899336	.00000
			8	(1.46297-002)+J(0.00000)	.0146297	.00000
			9	(3.16411-003)+J(0.00000)	.0031641	.00000
			10	(9.57699-003)+J(0.00000)	.0095770	.00000
			11	(4.55064-001)+J(0.00000)	.4550639	.00000
			12	(5.66095-002)+J(0.00000)	.0566095	.00000
			13	(-1.53083-001)+J(0.00000)	-.1530829	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(3.81061-001)+J(0.00000)	.3810613	.00000
			16	(2.15684-001)+J(0.00000)	.2156836	.00000
			17	(-1.79653-004)+J(0.00000)	-.0001797	.00000
			18	(-3.23428-001)+J(0.00000)	-.3234285	.00000

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(-5.33409+001)+J( 0.00000    )  0.00000       1.00000   1  ( 1.01808-002)+J( 0.00000    )   .0101808    .00000
                                                        2  ( 2.72255-003)+J( 0.00000    )   .0027226    .00000
                                                        3  ( 5.65232-003)+J( 0.00000    )   .0056523    .00000
                                                        4  ( 0.00000     )+J( 0.00000    )   .0000000    .00000
                                                        5  ( 8.21504-003)+J( 0.00000    )   .0082150    .00000
                                                        6  ( 2.40182-003)+J( 0.00000    )   .0024018    .00000
                                                        7  ( 3.17267-002)+J( 0.00000    )   .0317267    .00000
                                                        8  (-2.35773-003)+J( 0.00000    )  -.0023577    .00000
                                                        9  (-2.84758-003)+J( 0.00000    )  -.0028476    .00000
                                                       10  (-1.32364-003)+J( 0.00000    )  -.0013236    .00000
                                                       11  (-9.65241-002)+J( 0.00000    )  -.0965241    .00000
                                                       12  (-1.18107-002)+J( 0.00000    )  -.0118107    .00000
                                                       13  ( 7.11395-003)+J( 0.00000    )   .0071140    .00000
                                                       14  (-5.64513-001)+J( 0.00000    )  -.5645128    .00000
                                                       15  (-2.12618-001)+J( 0.00000    )  -.2126181    .00000
                                                       16  (-8.26582-002)+J( 0.00000    )  -.0826582    .00000
                                                       17  ( 1.75818-003)+J( 0.00000    )   .0017582    .00000
                                                       18  ( 1.00000+000)+J( 0.00000    )  1.0000000    .00000

(-4.34117+001)+J( 0.00000    )  0.00000       1.00000   1  ( 2.16693-002)+J( 0.00000    )   .0216693    .00000
                                                        2  (-3.11870-002)+J( 0.00000    )  -.0311870    .00000
                                                        3  (-3.48061-003)+J( 0.00000    )  -.0034806    .00000
                                                        4  ( 0.00000     )+J( 0.00000    )   .0000000    .00000
                                                        5  ( 3.34034-002)+J( 0.00000    )   .0334034    .00000
                                                        6  ( 4.22392-003)+J( 0.00000    )   .0042239    .00000
                                                        7  (-6.56857-002)+J( 0.00000    )  -.0656857    .00000
                                                        8  (-1.28638-002)+J( 0.00000    )  -.0128638    .00000
                                                        9  (-9.29780-003)+J( 0.00000    )  -.0092978    .00000
                                                       10  ( 1.43801-002)+J( 0.00000    )   .0143801    .00000
                                                       11  ( 1.00000+000)+J( 0.00000    )  1.0000000    .00000
                                                       12  ( 1.19826-001)+J( 0.00000    )   .1198264    .00000
                                                       13  ( 1.42091-001)+J( 0.00000    )   .1420912    .00000
                                                       14  (-8.07583-001)+J( 0.00000    )  -.8075833    .00000
                                                       15  (-2.99644-001)+J( 0.00000    )  -.2996436    .00000
                                                       16  (-1.68139-002)+J( 0.00000    )  -.0168139    .00000
                                                       17  ( 7.76791-003)+J( 0.00000    )   .0077679    .00000
                                                       18  (-1.82088-001)+J( 0.00000    )  -.1820880    .00000
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(-3.64338+001)+J(0.00000)	0.00000	1.00000	1	(-3.23683-003)+J(0.00000)	-.0032368	.00000
			2	(-3.12716-002)+J(0.00000)	-.0312716	.00000
			3	(6.22636-002)+J(0.00000)	.0622636	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-6.89940-002)+J(0.00000)	-.0689940	.00000
			6	(-2.32924-003)+J(0.00000)	-.0023292	.00000
			7	(-3.61644-002)+J(0.00000)	-.0361644	.00000
			8	(3.30902-002)+J(0.00000)	.0330902	.00000
			9	(-7.24145-003)+J(0.00000)	-.0072415	.00000
			10	(-2.14271-002)+J(0.00000)	-.0214271	.00000
			11	(1.00000+000)+J(0.00000)	1.0000000	.00000
			12	(1.17196-001)+J(0.00000)	.1171962	.00000
			13	(2.96287-001)+J(0.00000)	.2962870	.00000
			14	(3.73570-001)+J(0.00000)	.3735704	.00000
			15	(1.36428-001)+J(0.00000)	.1364278	.00000
			16	(-9.50841-002)+J(0.00000)	-.0950841	.00000
			17	(1.17806-002)+J(0.00000)	.0117806	.00000
			18	(-5.48778-001)+J(0.00000)	-.5487777	.00000
(-2.24429+001)+J(8.56895-001)	2.24593+001	.99927	1	(1.27324-002)+J(1.29115-002)	.0181334	45.40013
			2	(9.99790-003)+J(8.58487-003)	.0131779	40.65162
			3	(1.21972-002)+J(-4.08009-002)	.0425850	-73.35632
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-1.31416-001)+J(-1.17974-001)	.1766012	-138.08526
			6	(7.51559-004)+J(1.13639-003)	.0013624	56.52112
			7	(-6.88112-002)+J(-9.88980-002)	.1204816	-124.82940
			8	(5.66934-002)+J(3.43325-002)	.0662786	31.19834
			9	(-1.19345-001)+J(4.73786-002)	.1284053	158.34745
			10	(-1.80041-001)+J(-1.69560-001)	.2473164	-136.71716
			11	(-1.06053-001)+J(-1.20467-001)	.1604983	-131.35910
			12	(-1.14622-002)+J(-1.27656-002)	.0171564	-131.92064
			13	(-4.65424-002)+J(-6.00989-002)	.0760136	-127.75528
			14	(-7.84142-002)+J(-1.09227-001)	.1344594	-125.67459
			15	(-2.70649-002)+J(-3.71191-002)	.0459384	-126.09719
			16	(5.72371-002)+J(3.62457-001)	.3669486	81.02628
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
			18	(3.92977-001)+J(4.44319-001)	.5931699	48.50894

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(-1.42504+001)+J(8.05663+000)	1.63702+001	.87051	1	(-4.79771-002)+J(-2.68323-002)	.0549706	-150.78287
			2	(-7.93022-003)+J(-1.52210-002)	.0171630	-117.51976
			3	(-1.05453-001)+J(2.28867-001)	.2519932	114.73848
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-2.44699-002)+J(-1.30792-001)	.1330610	-100.59701
			6	(-1.53842-003)+J(-8.57746-003)	.0087143	-100.16821
			7	(1.75263-001)+J(6.77798-002)	.1879129	21.14306
			8	(-2.55893-001)+J(1.47784-001)	.2955016	149.99263
			9	(-6.79345-002)+J(1.71930-001)	.1846650	111.56038
			10	(4.90181-002)+J(3.25677-001)	.3293450	81.44058
			11	(3.72468-001)+J(4.03335-001)	.5490101	47.27843
			12	(4.54720-002)+J(3.41692-002)	.0568791	36.92242
			13	(2.14175-001)+J(3.50044-001)	.4103683	58.53954
			14	(4.00901-001)+J(4.80982-001)	.6261513	50.18867
			15	(1.54589-001)+J(1.41584-001)	.2096278	42.48588
			16	(9.19319-001)+J(3.00151-001)	.9670774	18.08151
			17	(1.95562-001)+J(3.09560-001)	.3661582	57.71765
			18	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-9.90053+000)+J(0.00000)	0.00000	1.00000	1	(5.61942-002)+J(0.00000)	.0561942	.00000
			2	(4.21361-002)+J(0.00000)	.0421361	.00000
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(3.07966-001)+J(0.00000)	.3079663	.00000
			6	(-2.75299-003)+J(0.00000)	-.0027530	.00000
			7	(6.10184-001)+J(0.00000)	.6101837	.00000
			8	(5.98816-002)+J(0.00000)	.0598816	.00000
			9	(5.00615-001)+J(0.00000)	.5006145	.00000
			10	(2.05448-001)+J(0.00000)	.2054478	.00000
			11	(3.63715-002)+J(0.00000)	.0363715	.00000
			12	(2.56882-003)+J(0.00000)	.0025688	.00000
			13	(1.46898-002)+J(0.00000)	.0146898	.00000
			14	(1.19236-001)+J(0.00000)	.1192364	.00000
			15	(2.97245-002)+J(0.00000)	.0297245	.00000
			16	(3.39669-001)+J(0.00000)	.3396692	.00000
			17	(9.82950-001)+J(0.00000)	.9829504	.00000
			18	(6.62533-001)+J(0.00000)	.6625326	.00000

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(-2.63878+000)+J(0.00000)	0.00000	1.00000	1	(-8.91095-001)+J(0.00000)	-.8910950	.00000
			2	(1.22868-002)+J(0.00000)	.0122868	.00000
			3	(-6.60825-002)+J(0.00000)	-.0660825	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(4.70569-001)+J(0.00000)	.4705688	.00000
			6	(5.15164-002)+J(0.00000)	.0515164	.00000
			7	(1.05208-001)+J(0.00000)	.1052078	.00000
			8	(-5.03635-001)+J(0.00000)	-.5036353	.00000
			9	(-4.05728-001)+J(0.00000)	-.4057278	.00000
			10	(-3.72013-001)+J(0.00000)	-.3720128	.00000
			11	(-5.53518-001)+J(0.00000)	-.5535177	.00000
			12	(8.79880-002)+J(0.00000)	.0879880	.00000
			13	(-5.35706-001)+J(0.00000)	-.5357058	.00000
			14	(-6.78709-001)+J(0.00000)	-.6787091	.00000
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(-8.10922-001)+J(0.00000)	-.8109222	.00000
			17	(-4.35924-001)+J(0.00000)	-.4359240	.00000
			18	(-1.42273-001)+J(0.00000)	-.1422733	.00000
(-1.66115+000)+J(1.25524-001)	1.66589+000	.99716	1	(2.45719-001)+J(1.26025-001)	.2761524	27.15255
			2	(-5.52272-002)+J(4.49307-002)	.0711956	140.86952
			3	(-1.56749-001)+J(-1.95693-002)	.1579660	-172.88374
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-3.00228-001)+J(-2.35585-002)	.3011507	-175.51328
			6	(-5.49502-002)+J(-1.78812-002)	.0577863	-161.97476
			7	(-1.37299-001)+J(2.37382-002)	.1393364	170.19090
			8	(8.71278-002)+J(5.88423-002)	.1051364	34.03337
			9	(4.51441-002)+J(4.14366-002)	.0612779	42.54806
			10	(3.37233-002)+J(7.56723-002)	.0828466	65.97994
			11	(2.04147-001)+J(6.85476-002)	.2153476	18.56083
			12	(-8.44026-002)+J(-4.46922-002)	.0955050	-152.09826
			13	(2.10219-001)+J(6.57772-002)	.2202691	17.37484
			14	(2.56894-001)+J(8.45669-002)	.2704562	18.22141
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(2.55302-001)+J(7.92441-002)	.2673180	17.24399
			17	(3.77043-002)+J(4.20059-002)	.0564457	48.08899
			18	(-4.13779-002)+J(2.34778-003)	.0414445	176.75253

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(-1.77146+001)+J( 0.00000     )  0.00000         1.00000   1  ( 1.74714-003)+J( 0.00000    )    .0017471       .00000
                                                           2  ( 7.15500-003)+J( 0.00000    )    .0071650       .00000
                                                           3  ( 6.62906-002)+J( 0.00000    )    .0662906       .00000
                                                           4  ( 0.00000     )+J( 0.00000    )    .0000000       .00000
                                                           5  ( 1.80207-002)+J( 0.00000    )    .0180207       .00000
                                                           6  ( 8.17413-004)+J( 0.00000    )    .0008174       .00000
                                                           7  ( 4.96879-002)+J( 0.00000    )    .0496879       .00000
                                                           8  (-1.77407-002)+J( 0.00000    )   -.0177407       .00000
                                                           9  ( 1.16788-001)+J( 0.00000    )    .1167879       .00000
                                                          10  (-5.03032-002)+J( 0.00000    )   -.0503032       .00000
                                                          11  (-7.65879-002)+J( 0.00000    )   -.0765879       .00000
                                                          12  (-7.62293-003)+J( 0.00000    )   -.0076229       .00000
                                                          13  (-4.95113-002)+J( 0.00000    )   -.0495113       .00000
                                                          14  (-6.35569-002)+J( 0.00000    )   -.0635569       .00000
                                                          15  (-2.05864-002)+J( 0.00000    )   -.0205864       .00000
                                                          16  (-3.68171-001)+J( 0.00000    )   -.3681706       .00000
                                                          17  ( 1.00000+000)+J( 0.00000    )   1.0000000       .00000
                                                          18  (-1.06206-001)+J( 0.00000    )   -.1062062       .00000

(-5.45363-001)+J( 0.00000     )  0.00000         1.00000   1  ( 2.89403-001)+J( 0.00000    )    .2894030       .00000
                                                           2  ( 1.26248-001)+J( 0.00000    )    .1262475       .00000
                                                           3  (-2.34941-001)+J( 0.00000    )   -.2349414       .00000
                                                           4  ( 0.00000     )+J( 0.00000    )    .0000000       .00000
                                                           5  (-1.53740-001)+J( 0.00000    )   -.1537396       .00000
                                                           6  (-1.83740-001)+J( 0.00000    )   -.1837400       .00000
                                                           7  (-5.02872-004)+J( 0.00000    )   -.0005029       .00000
                                                           8  ( 7.54442-002)+J( 0.00000    )    .0754442       .00000
                                                           9  ( 2.11424-002)+J( 0.00000    )    .0211424       .00000
                                                          10  ( 1.51837-001)+J( 0.00000    )    .1518373       .00000
                                                          11  ( 2.04761-001)+J( 0.00000    )    .2047612       .00000
                                                          12  ( 1.00000+000)+J( 0.00000    )   1.0000000       .00000
                                                          13  ( 2.05781-001)+J( 0.00000    )    .2057814       .00000
                                                          14  ( 2.20373-001)+J( 0.00000    )    .2203733       .00000
                                                          15  ( 2.69426-001)+J( 0.00000    )    .2694257       .00000
                                                          16  ( 1.74084-001)+J( 0.00000    )    .1740844       .00000
                                                          17  ( 1.36488-002)+J( 0.00000    )    .0136488       .00000
                                                          18  (-8.16476-002)+J( 0.00000    )   -.0816476       .00000
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F10A LINEAR MODEL 83/.9/30K 2/18/76

(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(5.62998-002)+J(0.00000)	.0562998	.00000
			2	(4.32256-002)+J(0.00000)	.0432268	.00000
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(-1.66634-002)+J(0.00000)	-.0166634	.00000
			5	(3.03390-001)+J(0.00000)	.3033898	.00000
			6	(-2.56052-003)+J(0.00000)	-.0025605	.00000
			7	(6.09095-001)+J(0.00000)	.6090947	.00000
			8	(5.69958-002)+J(0.00000)	.0569958	.00000
			9	(5.02972-001)+J(0.00000)	.5029725	.00000
			10	(2.05947-001)+J(0.00000)	.2059475	.00000
			11	(2.80615-002)+J(0.00000)	.0280615	.00000
			12	(1.99829-003)+J(0.00000)	.0019983	.00000
			13	(7.39322-003)+J(0.00000)	.0073932	.00000
			14	(1.12020-001)+J(0.00000)	.1120197	.00000
			15	(2.81415-002)+J(0.00000)	.0281415	.00000
			16	(3.30674-001)+J(0.00000)	.3306743	.00000
			17	(9.97145-001)+J(0.00000)	.9971452	.00000
			18	(6.56746-001)+J(0.00000)	.6567458	.00000

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CASE 9

**** THE MATRICES IN FINAL FORM ****

F-MATRIX

	SNFAN	SNCOM	PT3	PT45	PT7M	TT25H	TT25C	TT3	TT4PHI	TT4PLO
SNFAN	-1.0210+000	7.1705-001	-8.4248-001	3.5367-002	1.0306+000	-4.8636-001	-1.5353-001	-5.5470-002	5.3043-002	-8.0382-003
SNCOM	-1.4385-001	-1.9390+000	-5.7637-002	6.0930-001	-3.5037-001	6.5996-001	-4.1317-002	-6.4263-002	4.3657-001	4.7948-002
PT3	3.6035+000	-5.8150+000	-8.0500+000	-1.0995-001	2.6046+000	2.7665+000	-1.2014+000	-8.4575-001	-1.4638-001	-5.3026-001
PT45	6.2797+001	3.2898+002	2.4643+001	-1.1610+002	-1.7229-001	-2.0199+002	1.7576+001	1.5505+001	-2.5841-001	-3.4445-001
PT7M	4.0095+001	3.9437+001	1.1300+002	3.9550+002	-4.7850+002	-3.1480+001	2.7172+001	3.6447+000	-4.6059+001	1.5246+001
TT25H	3.7673+000	-2.2145+000	7.0542-001	-7.0484-003	-3.8770-002	-1.8670+001	4.9522-001	-4.2287-002	-4.0518-002	-4.2283-002
TT25C	2.9958+000	-4.3600+000	1.7976+000	8.9687-003	-6.2770-002	4.0972+000	-1.8730+001	-5.7406-002	-6.6377-002	-5.7397-002
TT3	-2.6352+000	6.5462+000	-1.0206+000	4.9945+000	3.1864-002	1.6691+001	-7.2098-001	-1.9970+001	3.2901-002	3.4960-002
TT4PHI	-2.1241-002	4.4253-002	-1.0515-002	-3.1862-002	-3.5397-003	7.2564-002	-1.0622-002	3.9367+000	-5.0010+001	-3.5400-003
TT4PLO	-2.9739-003	5.9472-003	-1.4870-003	-4.2496-003	-4.2482-004	9.5574-003	-1.4870-003	5.2482-001	-6.0012+000	-6.6710-001
TT4	-1.0913+001	-5.4460+001	-4.2423+000	1.1014+000	1.1816-001	3.5870+001	-2.9918+000	2.5305+001	1.2733-001	1.3656-001
TT45HI	3.6928-001	-8.5676-001	1.5687-001	-1.2708+001	1.1649+001	-1.0863+000	1.0618-001	8.2706+000	-1.4602+001	-1.6119+000
TT45LO	1.4769-001	-3.4322-001	6.2555-002	-5.0632+000	4.6594+000	-4.3530-001	4.1707-002	3.3078+000	-5.8409+000	-6.4558-001
TT5	-3.1912-001	-1.2455+000	3.7269+000	-5.9861+000	1.6015+000	2.0009-002	-3.5015-002	3.8814+000	-6.8845+000	-7.7028-001
TT6C	-5.3659-002	2.7721-001	3.5780-002	-1.7689-003	-1.7687-003	-1.8423-001	1.9883+001	1.0732-001	-1.7886-003	-1.7886-003
TT7M	-1.1505+001	1.4059+001	4.6052-001	2.3683-001	7.2827+000	-9.3408+000	1.2367+000	-9.3751-001	6.0861-001	-3.3554-001

F-MATRIX

	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	-3.0860-001	3.6972-001	2.8127-002	-4.3411-002	-3.2960-002	-1.5273-002
SNCOM	-1.8369-001	-1.0201-003	-1.0201-003	-1.0198-003	-5.1011-003	-1.0203-003
PT3	-2.4171+000	-5.7965-001	-5.6276-001	1.1012+000	5.6134-001	-5.7383-001
PT45	3.2986+001	-2.5842-001	-2.5838-001	-8.6134-002	1.4640+000	-2.5847-001
PT7M	1.8325+002	2.2860+001	2.2860+001	2.6607+001	2.3526+001	2.2534+001
TT25H	-4.0515-002	-4.2296-002	-4.2289-002	-2.6425-002	2.6433-002	-4.2295-002
TT25C	-5.7407-002	-5.7399-002	-6.6378-002	-5.5609-002	6.0993-002	-5.7408-002
TT3	3.4961-002	3.4952-002	3.4954-002	2.8787-002	-3.8037-002	3.4956-002
TT4PHI	4.6022+001	-3.5404-003	-3.5401-003	-8.8478-003	-5.3122-003	-3.5403-003
TT4PLO	6.1356+000	-4.2484-004	-4.2481-004	-1.2747-003	-6.3734-004	-4.2483-004
TT4	-4.8080+001	1.3655-001	1.3958-001	1.1049-001	-1.7031-001	1.3657-001
TT45HI	6.2307+001	-5.0000+001	0.0000	-7.2399-003	2.1723-002	0.0000
TT45LO	2.4931+001	-1.8000+001	-2.0010+000	-3.4751-003	8.6896-003	-8.6896-004
TT5	2.9323+001	-2.6351+000	-3.1109-001	-1.9860+001	1.5004-002	-1.4004-002
TT6C	2.3253-002	-1.7886-003	-1.7887-003	-1.7882-003	-2.0000+001	-1.7890-003
TT7M	-4.9763+000	-4.6056-001	-4.6054-001	2.5859+001	2.0619+001	-5.0450+001

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G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	7.0938-002	-8.6047-004	1.4628-002	-2.0753-002	-6.8670-002
SNCOM	1.2533-002	6.3982-003	5.1490-003	3.4062-002	6.1786-002
PT3	2.5295+000	-6.1614+000	-8.7602-002	2.5952-001	-3.2188+000
PT45	2.2881+000	-3.5575-001	-1.9640+000	-1.0165+001	-1.3301+002
PT7M	-9.6218+001	5.1394+000	-2.7580+000	-6.0688+000	1.5788+002
TT25H	1.3280-001	2.9779-002	8.1501-002	7.4044-002	-2.2894-001
TT25C	2.0920-001	9.0960-003	-2.2634-002	2.1316-001	-3.1697-001
TT3	-3.1067-001	-8.6295-002	7.1439-002	2.5454-001	5.9772-001
TT4PHI	8.5151-002	-2.7618-003	1.0002-003	4.2461-003	-2.0848+000
TT4PLO	1.1459-002	-3.3600-004	1.3942-004	5.7485-004	-2.7798-001
TT4	1.8357+001	4.2052-002	3.2985-001	1.7758+000	2.4328+001
TT45HT	2.2610-001	-8.2870-003	-1.1365-002	-5.5217-002	-3.7991+000
TT45LO	9.2182-002	-3.7279-003	-4.5008-003	-2.1924-002	-1.5201+000
TT5	1.8636-001	-6.2552-002	-1.1734-002	3.8705-003	-1.8147+000
TT6C	4.0012-003	-1.4905-003	2.0245-003	-8.2698-003	5.6403-002
TT7M	1.9509+000	2.6486-002	4.0684-001	-3.8359-001	-2.1634+000

H-MATRIX

	SNFAN	SNCOM	PT3	PT45	PT7M	TT25H	TT25C	TT3	TT4PHI	TT4PLO
FNMX	-1.1649+000	-6.3876+000	3.7113+000	3.5373-001	3.0656+000	3.9223+000	-5.0626-001	-4.0956-001	3.1123-001	-8.5742-002
WFAN	1.1079+000	2.0425-001	-7.4459-002	-3.9165-004	2.1541-003	-1.3984-001	-5.2341-002	2.3498-003	2.3011-003	2.3988-003
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	4.0733+000	4.2288+000	-1.4554+000	-7.5753-003	4.2854-002	-2.7385+000	-1.0240+000	4.6942-002	4.5565-002	4.7321-002
SMHC	2.4776+000	1.0032+001	9.6353-001	-4.5223+000	-2.8202-002	-7.2362+000	6.7661-001	-3.1379-002	-3.0019-002	-3.1246-002
	6.1241-001	1.0657-001	-4.9907-001	1.3556-002	1.4798-002	-4.1339-002	-4.3747-002	1.5857-002	1.5823-002	1.5865-002
	2.0347-001	4.3641-002	-1.1735-001	2.8016-003	3.1836-003	1.0398-002	1.4680-002	3.3976-003	3.5054-003	3.3983-003

H-MATRIX

	TT4	TT45HT	TT45LO	TT5	TT6C	TT7M
FNMX	-1.9913+000	-1.3573-001	-1.4746-001	1.5163+000	1.0332+000	-1.3572-001
WFAN	2.3498-003	2.3986-003	2.3982-003	1.9091-003	-2.9376-003	2.3992-003
TT4	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	4.6412-002	4.7318-002	4.7766-002	3.7933-002	-5.6704-002	4.7307-002
SMHC	-3.1250-002	-3.1574-002	-3.1249-002	-2.4896-002	3.7738-002	-3.1379-002
	1.6028-002	1.5855-002	1.6212-002	1.2850-002	-2.0440-002	1.5856-002
	3.3981-003	3.3977-003	3.4098-003	2.6706-003	-4.9720-003	3.3985-003

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D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	6.0284-001	-4.9539-001	4.5317-002	2.2553-001	-7.2103-001
WFAN	-6.4548-003	-3.8258-004	-3.6228-002	-7.1036-003	9.1487-003
TTG	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-1.7706-001	-1.4281-001	4.9324-001	-1.5390-001	-4.5798-001
SMHC	3.4919-001	1.7340-001	-6.0110-002	4.0480-001	-5.9702-001
	-6.6481-002	2.4342-002	-3.7025-003	-4.7170-003	9.5170-002
	-1.4284-002	4.7430-003	-5.4850-003	-1.7043-003	2.1600-002

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-4.80333+002)+J(0.00000)	0.00000	1.00000	1	(-2.14041-003)+J(0.00000)	-.0021404	.00000
			2	(7.29889-004)+J(0.00000)	.0007299	.00000
			3	(-5.54937-003)+J(0.00000)	-.0055494	.00000
			4	(5.99846-004)+J(0.00000)	.0005998	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(1.08053-004)+J(0.00000)	.0001081	.00000
			7	(1.73106-004)+J(0.00000)	.0001731	.00000
			8	(-1.09919-004)+J(0.00000)	-.0001099	.00000
			9	(3.77861-005)+J(0.00000)	.0000378	.00000
			10	(4.89714-006)+J(0.00000)	.0000049	.00000
			11	(-2.74565-004)+J(0.00000)	-.0002746	.00000
			12	(-2.70037-002)+J(0.00000)	-.0270037	.00000
			13	(-1.07332-002)+J(0.00000)	-.0107332	.00000
			14	(-3.56806-003)+J(0.00000)	-.0035681	.00000
			15	(-3.98973-006)+J(0.00000)	-.0000040	.00000
			16	(-1.68196-002)+J(0.00000)	-.0168196	.00000
(-1.19293+002)+J(0.00000)	0.00000	1.00000	1	(-9.20737-003)+J(0.00000)	-.0092074	.00000
			2	(-1.84860-003)+J(0.00000)	-.0018486	.00000
			3	(-2.37652-002)+J(0.00000)	-.0237652	.00000
			4	(9.15582-001)+J(0.00000)	.9155823	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(8.60213-004)+J(0.00000)	.0008602	.00000
			7	(1.02368-003)+J(0.00000)	.0010237	.00000
			8	(-4.68379-002)+J(0.00000)	-.0468379	.00000
			9	(5.56233-003)+J(0.00000)	.0055623	.00000
			10	(7.14165-004)+J(0.00000)	.0007142	.00000
			11	(-3.66583-003)+J(0.00000)	-.0036658	.00000
			12	(9.97170-003)+J(0.00000)	.0099717	.00000
			13	(3.88844-003)+J(0.00000)	.0038884	.00000
			14	(4.34102-002)+J(0.00000)	.0434102	.00000
			15	(-1.09834-004)+J(0.00000)	-.0001098	.00000
			16	(-1.28876-001)+J(0.00000)	-.1288764	.00000

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(-5.74186+001)+J(0.00000)	0.00000	1.00000	1	(-6.24822-003)+J(0.00000)	-.0062482	.00000
			2	(-2.31337-003)+J(0.00000)	-.0023134	.00000
			3	(7.28633-003)+J(0.00000)	.0072863	.00000
			4	(-5.29473-002)+J(0.00000)	-.0529473	.00000
			5	(-4.85130-002)+J(0.00000)	-.0485130	.00000
			6	(1.55659-003)+J(0.00000)	.0015566	.00000
			7	(1.54682-003)+J(0.00000)	.0015468	.00000
			8	(5.47863-003)+J(0.00000)	.0054786	.00000
			9	(3.03818-001)+J(0.00000)	.3038177	.00000
			10	(3.74141-002)+J(0.00000)	.0374141	.00000
			11	(-4.93248-002)+J(0.00000)	-.0493248	.00000
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(3.78355-001)+J(0.00000)	.3783550	.00000
			14	(1.60253-001)+J(0.00000)	.1602533	.00000
			15	(-7.40924-004)+J(0.00000)	-.0007409	.00000
			16	(-5.81485-001)+J(0.00000)	-.5814848	.00000
(-5.09811+001)+J(0.00000)	0.00000	1.00000	1	(2.42003-003)+J(0.00000)	.0024200	.00000
			2	(2.14998-004)+J(0.00000)	.0002150	.00000
			3	(5.79931-003)+J(0.00000)	.0057993	.00000
			4	(2.60064-003)+J(0.00000)	.0026006	.00000
			5	(2.95023-002)+J(0.00000)	.0295023	.00000
			6	(2.87798-004)+J(0.00000)	.0002878	.00000
			7	(3.44023-004)+J(0.00000)	.0003440	.00000
			8	(-7.99949-004)+J(0.00000)	-.0007999	.00000
			9	(-1.83637-003)+J(0.00000)	-.0018364	.00000
			10	(-2.24316-004)+J(0.00000)	-.0002243	.00000
			11	(1.46886-004)+J(0.00000)	.0001469	.00000
			12	(-3.48466-001)+J(0.00000)	-.3484862	.00000
			13	(-1.30843-001)+J(0.00000)	-.1308425	.00000
			14	(-3.24940-002)+J(0.00000)	-.0324940	.00000
			15	(-1.90917-004)+J(0.00000)	-.0001909	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.49538+001)+J(1.60378+000)	4.49824+001	.99936	1	(-1.04588-002)+J(-4.24202-004)	.0104674	-177.67740
			2	(4.84765-003)+J(3.27305-003)	.0058492	34.02659
			3	(1.27367-002)+J(-5.28218-003)	.0137904	-22.52162
			4	(-1.16785-002)+J(-6.89233-003)	.0135606	-149.45195
			5	(9.91640-002)+J(-7.29395-003)	.0994319	-4.20678
			6	(3.34461-003)+J(-2.66433-004)	.0033552	-4.55459
			7	(3.47813-003)+J(6.23055-006)	.0034781	.10264
			8	(-3.33695-003)+J(1.05569-003)	.0035000	162.44459
			9	(-4.05027-001)+J(-3.17715-001)	.5147721	-141.88833
			10	(-4.88658-002)+J(-3.80206-002)	.0619147	-142.11487
			11	(-3.39165-002)+J(-4.98321-002)	.0602791	-124.23980
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(3.72056-001)+J(-1.04140-003)	.3720574	-.16037
			14	(2.82849-002)+J(-2.89186-002)	.0404515	-45.63467
			15	(-2.70985-003)+J(-2.10838-004)	.0027180	-175.55111
			16	(1.21510-001)+J(-1.73453-001)	.2117795	-54.98735

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(-1.70784+001)+J(2.66356+000)	1.72849+001	.98806	1	(-1.62673-002)+J(1.49887-003)	.0163362	174.73562
			2	(-1.18376-003)+J(-1.25129-003)	.0017225	-133.41137
			3	(-3.45175-002)+J(1.37160-002)	.0371428	158.32894
			4	(6.81354-002)+J(-6.68363-002)	.0954438	-44.44856
			5	(2.24808-001)+J(-1.73181-002)	.2254739	-4.40509
			6	(-5.61415-003)+J(5.77271-002)	.0579994	95.55474
			7	(3.22964-002)+J(1.18529-001)	.1228498	74.75819
			8	(1.56124-001)+J(3.29965-002)	.1595724	11.93374
			9	(2.28620-001)+J(7.74933-002)	.2413965	18.72466
			10	(2.30736-002)+J(6.40258-003)	.0239455	15.50852
			11	(1.46128-001)+J(6.57800-002)	.1602507	24.23509
			12	(2.74290-001)+J(9.44114-002)	.2900835	18.99362
			13	(8.98669-002)+J(2.67183-002)	.0937547	16.55774
			14	(7.47836-001)+J(-1.09298-001)	.7557813	-8.31503
			15	(5.23656-001)+J(3.27374-001)	.6175670	32.01241
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.93900+001)+J(0.00000)	0.00000	1.00000	1	(-4.35022-003)+J(0.00000)	-.0043502	.00000
			2	(1.02517-003)+J(0.00000)	.0010252	.00000
			3	(-6.41977-003)+J(0.00000)	-.0064198	.00000
			4	(4.24786-002)+J(0.00000)	.0424786	.00000
			5	(8.61234-002)+J(0.00000)	.0861234	.00000
			6	(-1.02870-002)+J(0.00000)	-.0102870	.00000
			7	(3.04827-002)+J(0.00000)	.0304827	.00000
			8	(1.86135-002)+J(0.00000)	.0186135	.00000
			9	(-1.54146-003)+J(0.00000)	-.0015415	.00000
			10	(-1.64750-004)+J(0.00000)	-.0001648	.00000
			11	(-2.48696-003)+J(0.00000)	-.0024870	.00000
			12	(1.70024-002)+J(0.00000)	.0170024	.00000
			13	(5.63802-003)+J(0.00000)	.0056380	.00000
			14	(-3.57370-001)+J(0.00000)	-.3573702	.00000
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(3.58087-001)+J(0.00000)	.3580867	.00000
(-2.05848+001)+J(3.94233-001)	2.05885+001	.99982	1	(-3.58289-003)+J(2.47004-003)	.0043518	145.41770
			2	(-3.77292-005)+J(2.53778-003)	.0025381	90.85176
			3	(1.19408-002)+J(-4.63046-002)	.0478194	-75.53985
			4	(4.27464-002)+J(-7.89480-002)	.0897777	-61.56669
			5	(6.50461-002)+J(-2.67109-002)	.0703169	-22.32532
			6	(-1.03435-002)+J(2.31045-002)	.0253141	114.11735
			7	(-2.97713-002)+J(2.07018-002)	.0362614	145.18677
			8	(3.48084-002)+J(-8.51678-002)	.0920064	-67.76998
			9	(2.67590-002)+J(-8.68410-002)	.0908702	-72.87394
			10	(2.73529-003)+J(-9.07550-003)	.0094787	-73.22757
			11	(1.49271-002)+J(-4.79418-002)	.0502119	-72.70554
			12	(3.56472-002)+J(-6.00689-002)	.0698498	-59.31344
			13	(1.18550-002)+J(-2.01330-002)	.0233641	-59.50902
			14	(-6.28539-001)+J(6.55332-001)	.9080315	133.80449
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(1.07286-001)+J(6.28089-001)	.6371857	80.30666

F100 LINEAR MODEL 20/.9/30K NFW 1/30/76

(-6.53325+000)+J(0.00000)	0.00000	1.00000	1	(7.69774-002)+J(0.00000)	.0769774	.00000
			2	(1.55550-002)+J(0.00000)	.0155550	.00000
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(1.97156-001)+J(0.00000)	.1971561	.00000
			5	(4.55861-001)+J(0.00000)	.4558608	.00000
			6	(8.39161-002)+J(0.00000)	.0839161	.00000
			7	(1.82523-001)+J(0.00000)	.1825226	.00000
			8	(8.59270-002)+J(0.00000)	.0859270	.00000
			9	(-1.79549-002)+J(0.00000)	-.0179549	.00000
			10	(-6.15684-004)+J(0.00000)	-.0006157	.00000
			11	(-2.38771-002)+J(0.00000)	-.0238771	.00000
			12	(5.51139-002)+J(0.00000)	.0551139	.00000
			13	(7.71885-003)+J(0.00000)	.0077189	.00000
			14	(2.12913-001)+J(0.00000)	.2129134	.00000
			15	(2.71493-001)+J(0.00000)	.2714929	.00000
			16	(3.26423-001)+J(0.00000)	.3264233	.00000
(-1.18988+000)+J(3.91995-001)	1.25279+000	.94979	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(3.79596-002)+J(1.15771-001)	.1218475	-71.82853
			3	(8.15927-001)+J(-6.12635-002)	.8182242	-4.29396
			4	(4.37103-001)+J(3.43626-001)	.5560018	38.17242
			5	(6.29491-001)+J(2.33183-001)	.6712925	-20.32616
			6	(2.50861-001)+J(-2.44098-002)	.2520462	-5.55761
			7	(2.97482-001)+J(-6.00715-002)	.3034863	-11.41640
			8	(1.58595-001)+J(-1.11994-001)	.1941518	-35.22844
			9	(-6.62883-002)+J(-6.11639-002)	.0901951	-137.30240
			10	(5.89741-003)+J(7.03116-002)	.0705565	85.20552
			11	(-8.27032-002)+J(-7.49285-002)	.1115979	-137.82364
			12	(-1.86762-002)+J(-9.61794-002)	.0979759	-100.98900
			13	(-8.73934-002)+J(-1.42858-001)	.1674691	-121.45629
			14	(-1.50827-002)+J(-1.68530-001)	.1692032	-95.11411
			15	(3.10571-001)+J(-6.76086-002)	.3178446	-12.28119
			16	(-3.58068-002)+J(-4.85961-002)	.0603631	-126.38369
(-1.99179+000)+J(0.00000)	0.00000	1.00000	1	(-2.04781-001)+J(0.00000)	-.2047812	.00000
			2	(-2.04808-003)+J(0.00000)	-.0020481	.00000
			3	(-2.87059-001)+J(0.00000)	-.2870588	.00000
			4	(-8.46804-002)+J(0.00000)	-.0846804	.00000
			5	(-1.12194-001)+J(0.00000)	-.1121936	.00000
			6	(-6.29677-002)+J(0.00000)	-.0629677	.00000
			7	(-8.58170-002)+J(0.00000)	-.0858170	.00000
			8	(-3.10962-002)+J(0.00000)	-.0310962	.00000
			9	(1.45383-002)+J(0.00000)	.0145383	.00000
			10	(-4.47071-003)+J(0.00000)	-.0044707	.00000
			11	(1.77381-002)+J(0.00000)	.0177381	.00000
			12	(7.30556-003)+J(0.00000)	.0073056	.00000
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(-3.92557-002)+J(0.00000)	-.0392557	.00000
			15	(-9.43370-002)+J(0.00000)	-.0943370	.00000
			16	(-3.57066-002)+J(0.00000)	-.0357066	.00000

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**** THE MATRICES IN FINAL FORM ****

CASE 10

F-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
SNFAN	-7.0860+000	2.5378+000	-3.3698+000	-4.7907-001	9.2303-002	0.0000	6.0222+000	-1.7188+000	-2.8707-001	-1.7908-001
SNCOM	-2.1576+000	-8.1120+000	-2.8256-001	-2.8168-001	5.3365+000	0.0000	-2.7155+000	1.6778+000	-1.8834-001	-4.0068-001
PT7M	1.1802+000	-4.4935+000	-9.4600+000	3.5139+000	2.7157-001	0.0000	3.8584+000	2.1555+000	-1.0997+000	-1.0268+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	1.4404+002	1.8398+002	2.0478+001	1.4910+001	-1.6590+002	0.0000	-2.3108+000	-1.2257+002	1.4422+001	1.7523+001
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5000-001	0.0000	0.0000	0.0000	0.0000
PT45	9.0312+001	-2.8635+001	7.4889+000	1.5553+001	5.0621+002	0.0000	-5.7450+002	-4.4413+001	3.7605+000	-3.2946+001
TT25H	8.0365+000	-2.1508+000	4.6786-001	3.2258-001	2.4102-001	0.0000	2.1816-003	-1.8430+001	3.4577-001	3.2711-003
TT25C	6.3525+000	-5.2021+000	1.0374+000	3.9828-002	5.9451-001	0.0000	1.2089-002	3.7664+000	-1.9200+001	1.5385-002
TT3	-4.5607+000	6.8957+000	-7.1411-001	-7.4231-002	4.9943+000	0.0000	-4.1662-003	1.4221+001	-5.2555-001	-2.0010+001
TT4PHI	-1.5643-001	-3.7465-002	-2.8089-002	1.7797-001	1.6860-002	0.0000	-4.6829-003	1.2363-001	-1.9671-002	3.8015+000
TT4PLO	-2.0793-002	-4.9447-003	-3.7082-003	2.3396-002	2.3600-003	0.0000	-5.6177-004	1.6521-002	-2.5850-003	5.0700-001
TT4	-2.0959+001	-2.3998+001	-3.2939+000	2.0354+001	2.6117+000	0.0000	-2.2621-002	1.7333+001	-2.4278+000	2.0687+001
TT45HI	-4.1950-001	-2.4612+000	-5.4758-002	6.2939-001	-1.0701+001	0.0000	1.0371+001	3.8586-001	-3.9836-002	7.5855+000
TT45LO	-1.6759-001	-9.8422-001	-2.1959-002	2.5154-001	-4.2790+000	0.0000	4.1481+000	1.5416-001	-1.5683-002	3.0344+000
TT5	-1.0016+000	-1.5879+000	3.6512+000	3.6829-001	-5.2271+000	0.0000	1.3476+000	4.8227-001	-4.2477-002	3.7526+000
TT6C	3.2820-002	2.2212-001	3.2520-002	-7.1284-003	-2.1879-002	0.0000	0.0000	-1.5536-001	1.9819+001	1.6189-001
TT7M	-6.6165+000	9.9590+000	1.5726+000	-1.0152+000	1.7649-002	0.0000	8.0245+000	-6.6927+000	1.2160+000	-3.2120-001

F-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	4.3600-001	9.3693-002	-1.7142+000	2.8503+000	3.6079-001	-1.6371-001	1.1134-002	4.6843-002
SNCOM	3.5586+000	4.4843-001	-1.3730+000	6.8433-002	6.3641-002	6.0707-002	4.5987-002	5.9232-002
PT7M	-6.1525-002	-5.9340-001	-3.4378+000	-6.5756-001	-6.4637-001	2.2789+000	6.0182-001	-6.7101-001
WFCOM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	-2.2541+000	-2.2381+000	4.1724+001	-2.2380+000	-2.2379+000	-2.0441+000	-1.0908+000	-2.2380+000
FTIT	0.0000	0.0000	0.0000	2.2558-001	2.5065-002	0.0000	0.0000	0.0000
PT45	-7.9059+001	-1.1123+001	1.7614+002	-2.0960+000	-2.0647+000	-1.8803+000	-1.6950+000	-1.9106+000
TT25H	2.1813-003	2.1814-003	3.2717-003	3.2725-003	3.2710-003	8.7247-003	2.8356-002	3.2722-003
TT25C	1.5385-002	1.5386-002	2.3077-002	1.5385-002	1.5386-002	2.7470-002	9.2313-002	1.5385-002
TT3	-5.9508-003	-5.9519-003	-8.3319-003	-8.3325-003	-5.9513-003	-1.0713-002	-4.1660-002	-5.9513-003
TT4PHI	-5.0000+001	9.3667-004	4.6072+001	-2.8096-003	-2.8099-003	-1.8730-003	-5.6202-003	-2.8101-003
TT4PLO	-5.9994+000	-6.6640-001	6.1436+000	-3.3717-004	-3.3717-004	-2.2477-004	-6.7443-004	-3.3717-004
TT4	-2.9085-002	-3.0707-002	-4.8050+001	-3.0699-002	-3.4737-002	-6.2208-002	-1.9633-001	-3.0698-002
TT45HI	-1.2995+001	-1.4167+000	5.9983+001	-4.9990+001	1.6178-002	7.4689-003	4.9796-003	3.1119-002
TT45LO	-5.1983+000	-5.6643-001	2.3990+001	-1.8000+001	-1.9940+000	3.1372-003	1.7927-003	1.2550-002
TT5	-6.4120+000	-6.8980-001	2.9632+001	-3.4932+000	-3.7530-001	-1.9730+001	1.9355-002	2.5271-002
TT6C	0.0000	0.0000	4.4852-002	0.0000	0.0000	0.0000	-2.0000+001	0.0000
TT7M	1.2319+000	3.0190-001	-4.6858+000	1.9055-001	1.9061-001	3.5044+001	1.5624+001	-4.9820+001

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G-MATRIX

	WFMBH	ANMIX	CTVV	RCVV	BLC
SNFAN	0.0000	-1.5590-001	4.2885-001	-7.8479-003	3.3352-001
SNCOM	0.0000	-3.5870-002	1.2242-001	8.9481-003	9.1751-001
PT7M	0.0000	-7.4041+000	-2.2505-001	2.0978-002	-3.8935+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3 ✓	0.0000	2.0057+000	-8.2952+000	-4.7013-001	-1.7801+002
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT45	0.0000	9.0621-001	-2.6793+000	-1.5179-001	2.4379+001
TT25H	0.0000	3.0177-001	-1.1856-001	6.4244-003	-3.6960-002
TT25C	0.0000	7.8159-002	-3.8672-001	1.5290-002	4.3215-003
TT3	0.0000	-6.6926-002	2.6805-001	1.1141-002	-1.1931-001
TT4PHI	0.0000	-2.9130-003	9.2064-003	5.6052-004	-2.3041+000
TT4PLO	0.0000	-4.0198-004	1.3083-003	7.4133-005	-3.0562-001
TT4	0.0000	-3.7086-001	1.2494+000	7.3079-002	2.3616+001
TT45HI	0.0000	-4.5281-003	2.2659-002	1.3029-003	-3.3140+000
TT45LO	0.0000	-1.8644-003	9.0451-003	5.2158-004	-1.3254+000
TT5.	0.0000	-3.2170-002	6.3184-003	1.7263-003	-1.4081+000
TT6C	0.0000	1.1580-003	4.2486-003	-6.3061-004	1.7393-002
TT7M	0.0000	1.3525-002	9.1517-001	-3.0674-002	1.8979+000

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
FNMX	-5.7382-001	-1.0744+000	5.9570-001	-1.8550-001	3.0419-001	0.0000	1.3135+000	8.5511-001	-7.6895-002	-6.7714-002
WFAN	8.5875-001	2.0199-002	-4.3206-003	1.6462-002	-2.2183-003	0.0000	0.0000	-1.4479-002	-3.1536-003	0.0000
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	1.6534+000	1.7743+000	-3.8686-001	3.3289-002	-1.9885-001	0.0000	-2.8499-003	-1.2930+000	-2.8600-001	-3.8271-003
SMHC	6.3237+000	2.6007+001	9.8377-001	-3.7711-001	-6.8927+000	0.0000	7.5535-003	-9.7670+000	7.2413-001	1.0396-002

H-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	2.1023-001	5.8244-002	-7.4279-001	3.78[illegible]0-002	3.6926-002	8.6607-001	3.9661-001	3.8163-002
WFAN	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.3355-004	0.0000
TT4	0.0000	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	-3.6235-003	-3.6244-003	-5.2113-003	-3.8270-003	-3.8272-003	-6.7558-003	-2.3250-002	-3.8271-003
SMHC	9.9081-003	9.8290-003	1.2994-002	1.0721-002	9.8277-003	1.8117-002	5.9128-002	9.8305-003

D-MATRIX

	WFMBH	ANMIX	CTVV	RCVV	BLC
FNMX	0.0000	-8.4582-002	4.7171-003	2.9104-003	2.4764-001
WFAN	0.0000	1.3102-002	-8.4790-002	-5.6163-005	2.6371-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	1.5074-002	3.6000-001	-5.3087-003	3.9202-002
SMHC	0.0000	1.8580-001	-4.1791-001	-5.3905-004	1.3379+000

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(0.00000)+J(0.00000)	.0000000	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
			18	(0.00000)+J(0.00000)	.0000000	.00000
(-5.71799-002)+J(0.00000)	0.00000	1.00000	1	(-1.06227-002)+J(0.00000)	-.0106227	.00000
			2	(4.70598-003)+J(0.00000)	.0047060	.00000
			3	(-6.84772-003)+J(0.00000)	-.0068477	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(7.50757-003)+J(0.00000)	.0075076	.00000
			6	(8.10912-006)+J(0.00000)	.0000081	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(1.71343-004)+J(0.00000)	.0001713	.00000
			9	(1.49493-004)+J(0.00000)	.0001495	.00000
			10	(-2.20745-004)+J(0.00000)	-.0002207	.00000
			11	(2.85615-005)+J(0.00000)	.0000286	.00000
			12	(3.67261-006)+J(0.00000)	.0000037	.00000
			13	(-2.45896-004)+J(0.00000)	-.0002459	.00000
			14	(-1.96758-002)+J(0.00000)	-.0196758	.00000
			15	(-7.82821-003)+J(0.00000)	-.0078282	.00000
			16	(-2.44454-003)+J(0.00000)	-.0024445	.00000
			17	(-5.79347-006)+J(0.00000)	-.0000058	.00000
			18	(-1.54035-002)+J(0.00000)	-.0154035	.00000

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F100     LINEAR MODEL     83/1.2/0X     3/3/76

(-6.13793+001)+J( 0.00000    )  0.00000       1.00000    1  (-2.94640-002)+J( 0.00000    )  -.0294640      .00000
                                                         2  (-2.80078-002)+J( 0.00000    )  -.0280078      .00000
                                                         3  ( 1.47028-002)+J( 0.00000    )   .0147028      .00000
                                                         4  ( 0.00000     )+J( 0.00000    )   .0000000      .00000
                                                         5  (-1.52732-001)+J( 0.00000    )  -.1527320      .00000
                                                         6  (-3.84604-003)+J( 0.00000    )  -.0038460      .00000
                                                         7  (-2.51564-001)+J( 0.00000    )  -.2515641      .00000
                                                         8  ( 4.68417-003)+J( 0.00000    )   .0046842      .00000
                                                         9  ( 1.87713-003)+J( 0.00000    )   .0018771      .00000
                                                        10  ( 1.87747-002)+J( 0.00000    )   .0187747      .00000
                                                        11  ( 3.76469-001)+J( 0.00000    )   .3764687      .00000
                                                        12  ( 4.66102-002)+J( 0.00000    )   .0466102      .00000
                                                        13  (-9.45677-002)+J( 0.00000    )  -.0945677      .00000
                                                        14  ( 1.00000+000)+J( 0.00000    )  1.0000000      .00000
                                                        15  ( 3.79861-001)+J( 0.00000    )   .3798611      .00000
                                                        16  ( 1.97783-001)+J( 0.00000    )   .1977828      .00000
                                                        17  (-7.71131-004)+J( 0.00000    )  -.0007711      .00000
                                                        18  (-5.17818-001)+J( 0.00000    )  -.5178183      .00000

(-4.58502+001)+J( 0.00000    )  0.00000       1.00000    1  (-6.78943-002)+J( 0.00000    )  -.0678943      .00000
                                                         2  ( 4.50332-002)+J( 0.00000    )   .0450332      .00000
                                                         3  ( 3.50655-002)+J( 0.00000    )   .0350655      .00000
                                                         4  ( 0.00000     )+J( 0.00000    )   .0000000      .00000
                                                         5  (-6.99243-002)+J( 0.00000    )  -.0699243      .00000
                                                         6  (-5.15135-003)+J( 0.00000    )  -.0051514      .00000
                                                         7  (-2.80877-002)+J( 0.00000    )  -.0280877      .00000
                                                         8  ( 2.30076-002)+J( 0.00000    )   .0230076      .00000
                                                         9  ( 2.12179-002)+J( 0.00000    )   .0212179      .00000
                                                        10  (-2.13709-002)+J( 0.00000    )  -.0213709      .00000
                                                        11  (-4.88376-001)+J( 0.00000    )  -.4883758      .00000
                                                        12  (-5.88664-002)+J( 0.00000    )  -.0588664      .00000
                                                        13  (-4.22634-002)+J( 0.00000    )  -.0422634      .00000
                                                        14  ( 1.00000+000)+J( 0.00000    )  1.0000000      .00000
                                                        15  ( 3.72728-001)+J( 0.00000    )   .3727283      .00000
                                                        16  ( 5.04886-002)+J( 0.00000    )   .0504886      .00000
                                                        17  (-1.63234-002)+J( 0.00000    )  -.0163234      .00000
                                                        18  ( 4.94157-001)+J( 0.00000    )   .4941571      .00000
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F100 LINEAR MODEL 83/1.2/0K 3/3/76

(-3.52297+001)+J(0.00000)	0.00000	1.00000	1	(-3.51768-003)+J(0.00000)	-.0035177	.00000
			2	(-1.14331-001)+J(0.00000)	-.1143311	.00000
			3	(5.98055-002)+J(0.00000)	.0598055	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-5.40737-002)+J(0.00000)	-.0540737	.00000
			6	(-2.79059-003)+J(0.00000)	-.0027906	.00000
			7	(-9.56388-002)+J(0.00000)	-.0956388	.00000
			8	(-1.33474-002)+J(0.00000)	-.0133474	.00000
			9	(-3.61502-002)+J(0.00000)	-.0361502	.00000
			10	(8.32583-002)+J(0.00000)	.0832583	.00000
			11	(1.00000+000)+J(0.00000)	1.0000000	.00000
			12	(1.16593-001)+J(0.00000)	.1165932	.00000
			13	(3.13688-001)+J(0.00000)	.3136880	.00000
			14	(4.15891-001)+J(0.00000)	.4158911	.00000
			15	(1.51430-001)+J(0.00000)	.1514305	.00000
			16	(-1.38604-001)+J(0.00000)	-.1386036	.00000
			17	(4.65666-002)+J(0.00000)	.0465666	.00000
			18	(-4.10914-001)+J(0.00000)	-.4109140	.00000
(-7.20371+000)+J(4.12167+000)	8.29949+000	.86797	1	(5.08711-001)+J(6.48084-001)	.8238931	51.87004
			2	(-1.38244-001)+J(-4.47676-003)	.1383169	-178.14525
			3	(6.95964-001)+J(-1.66294-001)	.7155550	-13.43833
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(8.40557-002)+J(3.53100-001)	.3629668	76.60992
			6	(-6.85276-003)+J(1.48978-003)	.0070128	167.73481
			7	(1.27086-001)+J(3.70700-001)	.3918792	71.07694
			8	(5.44173-001)+J(2.71538-001)	.6081585	26.51684
			9	(6.46513-001)+J(2.09290-001)	.6795451	17.93790
			10	(3.43365-001)+J(9.70362-002)	.3568127	15.78049
			11	(1.36443-001)+J(-1.69917-001)	.2179184	-51.23549
			12	(2.73463-003)+J(-1.73671-002)	.0175811	-81.05163
			13	(1.14618-001)+J(-1.52334-001)	.1906380	-53.04168
			14	(1.80846-001)+J(-1.64154-001)	.2442368	-42.23003
			15	(2.85578-002)+J(-6.27914-002)	.0689805	-65.54373
			16	(2.72904-001)+J(-4.83945-001)	.5555889	-60.58069
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
			18	(4.03573-001)+J(-5.01542-001)	.6437515	-51.17762

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F100     LINEAR MODEL     83/1.2/0K     3/3/76

(-5.14435+000)+J( 0.00000     )  0.00000        1.00000   1  ( 1.00000+000)+J( 0.00000      )  1.0000000      .00000
                                                           2  ( 3.21262-001)+J( 0.00000      )   .3212622      .00000
                                                           3  ( 9.25026-001)+J( 0.00000      )   .9250276      .00000
                                                           4  ( 0.00000     )+J( 0.00000      )   .0000000      .00000
                                                           5  ( 9.87878-001)+J( 0.00000      )   .9878777      .00000
                                                           6  ( 3.68030-003)+J( 0.00000      )   .0036803      .00000
                                                           7  ( 9.16170-001)+J( 0.00000      )   .9161697      .00000
                                                           8  ( 6.21414-001)+J( 0.00000      )   .6214137      .00000
                                                           9  ( 6.16195-001)+J( 0.00000      )   .6161955      .00000
                                                          10  ( 6.99942-001)+J( 0.00000      )   .6999419      .00000
                                                          11  (-7.64229-002)+J( 0.00000      )  -.0764229      .00000
                                                          12  (-4.08894-004)+J( 0.00000      )  -.0004089      .00000
                                                          13  (-1.29506-001)+J( 0.00000      )  -.1295063      .00000
                                                          14  (-7.96140-002)+J( 0.00000      )  -.0796140      .00000
                                                          15  (-2.11541-003)+J( 0.00000      )  -.0021154      .00000
                                                          16  (-1.51508-001)+J( 0.00000      )  -.1515085      .00000
                                                          17  ( 8.30400-001)+J( 0.00000      )   .8304004      .00000
                                                          18  ( 2.22356-001)+J( 0.00000      )   .2223557      .00000

(-[illegible].40007+001)+J( 0.00000     )  0.00000        1.00000   1  ( 7.56751-002)+J( 0.00000      )   .0756751      .00000
                                                           2  (-8.04010-002)+J( 0.00000      )  -.0804010      .00000
                                                           3  (-9.92946-002)+J( 0.00000      )  -.0992946      .00000
                                                           4  ( 0.00000     )+J( 0.00000      )   .0000000      .00000
                                                           5  (-1.33616-001)+J( 0.00000      )  -.1336163      .00000
                                                           6  (-4.34797-003)+J( 0.00000      )  -.0043480      .00000
                                                           7  (-1.17475-001)+J( 0.00000      )  -.1174751      .00000
                                                           8  ( 1.91244-001)+J( 0.00000      )   .1912441      .00000
                                                           9  ( 3.03228-001)+J( 0.00000      )   .3032284      .00000
                                                          10  ( 1.67190-001)+J( 0.00000      )   .1671902      .00000
                                                          11  ( 2.46033-001)+J( 0.00000      )   .2460328      .00000
                                                          12  ( 2.21123-002)+J( 0.00000      )   .0221123      .00000
                                                          13  ( 1.78458-001)+J( 0.00000      )   .1784579      .00000
                                                          14  ( 2.56470-001)+J( 0.00000      )   .2564698      .00000
                                                          15  ( 7.70888-002)+J( 0.00000      )   .0770888      .00000
                                                          16  ( 6.54609-001)+J( 0.00000      )   .6546088      .00000
                                                          17  ( 1.00000+000)+J( 0.00000      )  1.0000000      .00000
                                                          18  ( 9.69680-001)+J( 0.00000      )   .9696804      .00000
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F100 LINEAR MODEL 83/1.2/0K 3/3/76

(-2.04809+001)+J(1.84447+000)	2.05638+001	.99597	1	(5.88642-003)+J(-6.43571-003)	.0087217	-47.55238
			2	(1.30399-002)+J(-2.24685-002)	.0259783	-59.87063
			3	(-1.05374-001)+J(-1.45970-002)	.1063798	-172.11323
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-3.04945-002)+J(-1.56083-002)	.0342569	-152.89490
			6	(9.06344-004)+J(-1.21454-003)	.0015154	-53.26815
			7	(-3.65043-002)+J(-1.27357-002)	.0386622	-160.76709
			8	(-1.35001-003)+J(5.64220-003)	.0058015	103.45617
			9	(4.34053-002)+J(3.11184-002)	.0534076	35.63778
			10	(-4.77866-002)+J(5.38172-002)	.0719712	131.60322
			11	(-7.02555-002)+J(1.23313-001)	.1419220	119.67165
			12	(-7.00322-003)+J(1.30610-002)	.0148201	118.19985
			13	(-4.59004-002)+J(7.16663-002)	.0851053	122.63846
			14	(-6.88599-002)+J(1.12100-001)	.1315604	121.56120
			15	(-2.24330-002)+J(3.81027-002)	.0442160	120.48750
			16	(7.51751-001)+J(2.95518-001)	.8077500	21.46011
			17	(2.03345-001)+J(-5.14374-001)	.5531092	-68.42984
			18	(1.00000+000)+J(0.00000)	1.0000000	.00000

(-2.25810+001)+J(0.00000)	0.00000	1.00000	1	(1.53446-002)+J(0.00000)	.0153446	.00000
			2	(4.67454-002)+J(0.00000)	.0467454	.00000
			3	(-1.36921-001)+J(0.00000)	-.1369213	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-1.22316-002)+J(0.00000)	-.0122316	.00000
			6	(2.50593-003)+J(0.00000)	.0025059	.00000
			7	(-1.66345-002)+J(0.00000)	-.0166345	.00000
			8	(5.57305-003)+J(0.00000)	.0055730	.00000
			9	(9.24783-002)+J(0.00000)	.0924783	.00000
			10	(-1.31632-001)+J(0.00000)	-.1316319	.00000
			11	(-2.69535-001)+J(0.00000)	-.2695353	.00000
			12	(-2.88188-002)+J(0.00000)	-.0288188	.00000
			13	(-1.49522-001)+J(0.00000)	-.1495222	.00000
			14	(-2.38983-001)+J(0.00000)	-.2389835	.00000
			15	(-8.17523-002)+J(0.00000)	-.0817523	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(-7.01505-001)+J(0.00000)	-.7015053	.00000
			18	(8.99989-001)+J(0.00000)	.8999887	.00000

(-6.86438-001)+J(0.00000)	0.00000	1.00000	1	(1.45493-001)+J(0.00000)	.1454930	.00000
			2	(9.00815-002)+J(0.00000)	.0900815	.00000
			3	(-2.44381-002)+J(0.00000)	-.0244381	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.72081-001)+J(0.00000)	.1720809	.00000
			6	(4.39902-002)+J(0.00000)	.0439902	.00000
			7	(1.33876-001)+J(0.00000)	.1338758	.00000
			8	(5.75895-002)+J(0.00000)	.0575895	.00000
			9	(4.12499-002)+J(0.00000)	.0412499	.00000
			10	(8.41860-002)+J(0.00000)	.0841860	.00000
			11	(-3.46222-002)+J(0.00000)	-.0346222	.00000
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(-4.36713-002)+J(0.00000)	-.0436713	.00000
			14	(-7.43416-002)+J(0.00000)	-.0743416	.00000
			15	(-9.68962-002)+J(0.00000)	-.0968962	.00000
			16	(-1.16643-001)+J(0.00000)	-.1166432	.00000
			17	(4.35167-002)+J(0.00000)	.0435167	.00000
			18	(-4.81428-002)+J(0.00000)	-.0481428	.00000
(-1.93473+001)+J(0.00000)	0.00000	1.00000	1	(4.16280-003)+J(0.00000)	.0041628	.00000
			2	(-1.17627-002)+J(0.00000)	-.0117627	.00000
			3	(-1.10152-001)+J(0.00000)	-.1101524	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-5.73032-002)+J(0.00000)	-.0573032	.00000
			6	(-6.14677-004)+J(0.00000)	-.0006147	.00000
			7	(-5.59064-002)+J(0.00000)	-.0559064	.00000
			8	(2.06162-002)+J(0.00000)	.0206162	.00000
			9	(-1.97284-002)+J(0.00000)	-.0197284	.00000
			10	(7.23246-003)+J(0.00000)	.0072325	.00000
			11	(5.30225-002)+J(0.00000)	.0530225	.00000
			12	(5.42689-003)+J(0.00000)	.0054269	.00000
			13	(3.45886-002)+J(0.00000)	.0345886	.00000
			14	(5.01916-002)+J(0.00000)	.0501916	.00000
			15	(1.66070-002)+J(0.00000)	.0166070	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(-6.07216-001)+J(0.00000)	-.6072157	.00000
			18	(8.05395-001)+J(0.00000)	.8053950	.00000

F100 LINEAR MODFL 83/1.2/0K 3/3/76

(-2.01534+000)+J(0.00000)	0.00000	1.00000	1	(1.17462-001)+J(0.00000)	.1174619	.00000
			2	(-5.17386-003)+J(0.00000)	-.0051739	.00000
			3	(-3.83454-002)+J(0.00000)	-.0383454	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(3.88932-002)+J(0.00000)	.0388932	.00000
			6	(-1.25899-002)+J(0.00000)	-.0125899	.00000
			7	(4.04133-002)+J(0.00000)	.0404133	.00000
			8	(5.91647-002)+J(0.00000)	.0591647	.00000
			9	(5.81106-002)+J(0.00000)	.0581106	.00000
			10	(2.51968-002)+J(0.00000)	.0251968	.00000
			11	(-1.38639-002)+J(0.00000)	-.0138639	.00000
			12	(4.05978-003)+J(0.00000)	.0040598	.00000
			13	(-1.62277-002)+J(0.00000)	-.0162277	.00000
			14	(-1.25864-002)+J(0.00000)	-.0125864	.00000
			15	(1.00000+000)+J(0.00000)	1.0000000	.00000
			16	(-5.66411-002)+J(0.00000)	-.0566411	.00000
			17	(6.37454-002)+J(0.00000)	.0637454	.00000
			18	(-3.42647-002)+J(0.00000)	-.0342647	.00000
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(4.19846-001)+J(0.00000)	.4198465	.00000
			2	(3.46020-002)+J(0.00000)	.0346020	.00000
			3	(3.64184-001)+J(0.00000)	.3641841	.00000
			4	(-4.72616-001)+J(0.00000)	-.4726161	.00000
			5	(1.56096-001)+J(0.00000)	.1560956	.00000
			6	(2.08434-003)+J(0.00000)	.0020843	.00000
			7	(1.13351-001)+J(0.00000)	.1133513	.00000
			8	(4.22110-001)+J(0.00000)	.4221097	.00000
			9	(5.02740-001)+J(0.00000)	.5027404	.00000
			10	(4.57201-001)+J(0.00000)	.4572014	.00000
			11	(-1.01372-001)+J(0.00000)	-.1013720	.00000
			12	(-7.26880-003)+J(0.00000)	-.0072688	.00000
			13	(-1.23069-001)+J(0.00000)	-.1230691	.00000
			14	(-8.76381-002)+J(0.00000)	-.0876381	.00000
			15	(-2.20437-002)+J(0.00000)	-.0220437	.00000
			16	(-7.56774-002)+J(0.00000)	-.0756774	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
			18	(2.65478-001)+J(0.00000)	.2654779	.00000

F100 LINEAR MODEL 83/.9/45K 2/24/76

CASE 11

**** THE MATRICES IN FINAL FORM ****

F-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
SNFAN	-1.1470+000	9.4073-002	-8.7803-001	-2.2609-001	8.6111-002	0.0000	1.1509+000	-2.6881-002	5.0773-002	-7.4661-003
SNCOM	-9.5478-002	-1.5100+000	-3.7471-001	-1.0329-002	1.0222+000	0.0000	-4.9521-001	4.1475-001	4.2422-002	-7.5021-002
PT7M	2.3495+000	-4.1455+000	-9.3480+000	1.0428+000	6.8658-001	0.0000	4.0863+000	3.4417+000	8.0710-002	-5.2590-001
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	2.8253+001	2.0161+002	1.1224+002	1.6990+001	-1.6250+002	0.0000	-2.9910+000	-1.6579+002	-1.3209+001	1.8694+001
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5000-001	0.0000	0.0000	0.0000	0.0000
PT45	2.0956+001	-4.1349+001	1.1787+001	2.3531+002	4.4829+002	0.0000	-5.9710+002	-1.0571+002	-4.1902+001	-6.8127+001
TT25H	1.1503+001	-2.8253-001	2.4429+000	-5.3823-001	-3.9763-002	0.0000	1.4484-001	-1.9650+001	-2.2860-001	-7.0999-002
TT25C	8.6950+000	-3.7954-002	6.7646+000	1.9008+000	-7.7316-002	0.0000	-6.3671-001	1.2513-001	-2.0430+001	-1.0964-001
TT3	-7.1069-001	7.7781+000	-2.8600+000	-8.0634-001	4.4163+000	0.0000	8.9280-002	1.5390+001	3.5004-001	-1.9950+001
TT4PHI	-3.5855-002	-7.9672-002	-1.3841-001	1.7512-001	2.8883-002	0.0000	5.9756-003	2.0717-001	1.8923-002	3.9199+000
TT4PLO	-4.7793-003	-1.0635-002	-1.8526-002	2.3582-002	3.8240-003	0.0000	7.1717-004	2.7599-002	2.5099-003	5.2271-001
TT4	-4.5775+000	-3.0175+001	-1.8408+001	1.9828+001	3.4960+000	0.0000	5.8451-001	2.7659+001	2.2742+000	1.7512+001
TT45HI	-1.4791-001	-3.3537+000	-6.3897-001	6.1107-001	-1.0307+001	0.0000	1.0388+001	9.7567-001	9.5062-002	7.6329+000
TT45LO	-5.8921-002	-1.3416+000	-2.5573-001	2.4438-001	-4.1231+000	0.0000	4.1551+000	3.9034-001	3.8044-002	3.0544+000
TT5	-9.5711-001	-1.8997+000	3.5107+000	3.1701-001	-5.0195+000	0.0000	1.1072+000	7.4710-001	8.7658-002	3.7820+000
TT6C	-2.0086-001	5.3680-001	3.2496-001	6.4632-002	-6.5534-002	0.0000	-1.5338-002	-4.8386-001	1.9632+001	2.4265-001
TT7M	-1.3628+001	1.8501+001	1.1170+001	-1.6979+000	-5.7440-001	0.0000	8.8744+000	-1.5446+001	-7.9027-001	-1.5553-001

F-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
SNFAN	1.0453-001	4.3614-002	-2.9217-001	5.5604-001	9.1584-002	1.4933-003	2.8871-002	3.6337-002
SNCOM	6.1186-001	7.1490-002	-2.5067-001	4.3206-003	5.1064-003	4.3203-003	-2.3564-003	4.3207-003
PT7M	3.6965-001	-1.1709-001	-2.7196+000	-1.7354-001	-1.6667-001	2.4440+000	4.7555-001	-1.7158-001
WFCOM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PT3	-1.8936+000	-1.6445+000	4.1820+001	-1.6444+000	-1.8439+000	-1.6445+000	2.9898-001	-1.5949+000
FTIT	0.0000	0.0000	0.0000	2.1267-001	2.3630-002	0.0000	0.0000	0.0000
PT45	-1.0849+002	-4.5098+001	1.3436+002	-3.7048+001	-3.7047+001	-3.7045+001	-3.6121+001	-3.7048+001
TT25H	1.9311-001	2.0023-001	-5.3947-002	2.0021-001	2.0020-001	2.0304-001	-8.5189-003	2.0587-001
TT25C	-5.7196-001	-5.8062-001	-5.3405-002	-5.8045-001	-5.9024-001	-5.8044-001	1.1250-002	-5.7914-001
TT3	6.5186-002	5.3853-002	3.7560-002	5.3851-002	5.7390-002	5.3856-002	2.1255-003	5.1019-002
TT4PHI	-5.0000+001	3.9844-003	4.5957+001	3.9841-003	-1.9921-003	3.9840-003	3.9826-003	5.9775-003
TT4PLO	-5.9994+000	-6.6620-001	6.1273+000	4.7805-004	-2.3903-004	4.7808-004	4.7799-004	7.1730-004
TT4	4.0501-001	3.6496-001	-4.7350+001	3.6496-001	3.7860-001	3.7007-001	4.1685-002	3.5903-001
TT45HI	-1.2454+001	-1.3601+000	5.9346+001	-4.9980+001	1.8489-002	1.8484-002	1.8484-002	2.5088-002
TT45LO	-4.9816+000	-5.4383-001	2.3731+001	-1.7991+001	-1.9930+000	7.1301-003	7.6052-003	9.9839-003
TT5	-6.0979+000	-6.4127-001	2.9227+001	-3.4860+000	-3.3642-001	-1.9730+001	2.6010-002	3.7323-002
TT6C	-1.2548-002	-9.7618-003	7.3916-002	-9.7607-003	-1.2550-002	-9.7603-003	-2.0000+001	-9.7601-003
TT7M	1.4069+000	4.4453+001	-4.8875+000	3.0191-001	3.1652-001	4.0247+001	1.1010+001	-4.9690+001

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G-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	0.0000	-6.7122-002	-2.6072-003	4.9249-004	2.2168-001
SNCOM	0.0000	-2.3982-003	-6.8320-005	-5.2211-003	1.1235-001
PT7M	0.0000	-6.1754+000	1.2699-002	-1.8709-002	-1.6077-001
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	0.0000	-9.3998-001	1.9500-002	5.1754-001	-1.9143+002
FTIT	0.0000	0.0000	0.0000	0.0000	0.0000
PT45	0.0000	2.1036+001	-3.1844-001	-7.4998-001	-1.9144+002
TT25H	0.0000	-1.1002-001	1.5002-002	1.1717-003	-2.6429-001
TT25C	0.0000	1.3906+000	1.1732-002	7.8748-003	1.0223+000
TT3	0.0000	1.0229-001	-4.8647-004	3.4269-002	1.4893+000
TT4PHI	0.0000	1.0480-002	-3.4570-005	-6.1636-004	-2.7739+000
TT4PLO	0.0000	1.3567-003	-4.7206-006	-8.3811-005	-3.7001-001
TT4	0.0000	2.0185-001	-2.0986-003	-8.5448-002	3.2919+001
TT45HI	0.0000	2.3680-002	-1.8088-005	-2.8702-003	-3.6748+000
TT45LO	0.0000	9.3859-003	-6.7791-006	-1.1436-003	-1.4702+000
TT5	0.0000	2.6082-002	3.3312-004	-1.4742-003	-2.0014+000
TT6C	0.0000	1.5098-003	-1.1855-003	1.0370-003	-1.2145-001
TT7M	0.0000	-6.4988-001	-6.2041-002	6.1374-002	1.2999+000

H-MATRIX

	SNFAN	SNCOM	PT7M	WFCOM	PT3	FTIT	PT45	TT25H	TT25C	TT3
FNMX	2.6104-001	-8.5445-001	-1.8575-001	-4.5916-001	2.7578-001	0.0000	1.0809+000	9.1168-001	1.3189-001	-1.2155-002
WFAN	6.9558-001	3.5016-004	-2.5011-003	9.8214-003	0.0000	0.0000	0.0000	-1.5008-004	3.5025-004	0.0000
TT4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	1.3727+001	6.4099-001	-4.7539+000	2.4292-002	4.2481-002	0.0000	1.4786-001	-3.9772-001	5.8519-001	8.4631-002
SMHC	1.2724+000	1.1586+001	5.1152+000	9.0031-001	-7.2306+000	0.0000	-1.6320-001	-6.4331+000	-6.3354-001	-9.2582-002
DP25Q	1.8573-001	-3.5102-001	-6.1926-001	-7.9583-002	4.9804-002	0.0000	1.9900-002	3.3755-001	1.6677-001	1.1137-002
DP25SI	1.0331-001	6.1723-002	-1.5879-001	-1.8241-002	-2.2531-003	0.0000	5.1630-003	3.0515-002	5.9224-002	2.8976-003

H-MATRIX

	TT4PHI	TT4PLO	TT4	TT45HI	TT45LO	TT5	TT6C	TT7M
FNMX	2.0179-001	9.7245-002	-5.3205-001	7.2107-002	7.3443-002	7.1409-001	2.3067-001	7.1559-002
WFAN	0.0000	0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000
TT4	0.0000	0.0000	1.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	1.0284-001	9.1097-002	5.8182-002	9.1427-002	9.4959-002	9.1768-002	9.2332-003	9.0668-002
SMHC	-1.1307-001	-1.0180-001	-6.3368-002	-1.0155-001	-1.0500-001	-1.0204-001	-1.0370-002	-1.0023-001
DP25QT	1.3235-002	1.2235-002	7.6200-003	1.2220-002	1.2411-002	1.2305-002	1.2994-003	1.2233-002
DP25SC	3.4693-003	3.2664-003	1.9077-003	3.2678-003	3.2076-003	3.2785-003	2.8614-004	3.2555-003

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D-MATRIX

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	0.0000	2.8861-002	2.2710-003	-9.7421-004	5.3197-001
WFAN	0.0000	9.2696-003	2.9489-003	2.4234-005	2.5309-002
TT4	0.0000	0.0000	0.0000	0.0000	0.0000
SMAF	0.0000	4.5544-001	4.1220-003	4.7825-003	3.6763+000
SMHC	0.0000	-3.4051-002	6.8301-004	-4.6298-002	-1.2589+000
DP25QT	0.0000	3.5028-002	1.3590-003	-8.9200-004	1.2850-001
DP25SC	0.0000	1.2468-002	5.8570-004	1.9324-004	3.0950-002

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EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.50000-001)+J(0.00000)	0.00000	1.00000	1	(0.00000)+J(0.00000)	.0000000	.00000
			2	(0.00000)+J(0.00000)	.0000000	.00000
			3	(0.00000)+J(0.00000)	.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(0.00000)+J(0.00000)	.0000000	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(0.00000)+J(0.00000)	.0000000	.00000
			8	(0.00000)+J(0.00000)	.0000000	.00000
			9	(0.00000)+J(0.00000)	.0000000	.00000
			10	(0.00000)+J(0.00000)	.0000000	.00000
			11	(0.00000)+J(0.00000)	.0000000	.00000
			12	(0.00000)+J(0.00000)	.0000000	.00000
			13	(0.00000)+J(0.00000)	.0000000	.00000
			14	(0.00000)+J(0.00000)	.0000000	.00000
			15	(0.00000)+J(0.00000)	.0000000	.00000
			16	(0.00000)+J(0.00000)	.0000000	.00000
			17	(0.00000)+J(0.00000)	.0000000	.00000
			18	(0.00000)+J(0.00000)	.0000000	.00000
(-5.92011+002)+J(0.00000)	0.00000	1.00000	1	(-1.94045-003)+J(0.00000)	-.0019404	.00000
			2	(8.18853-004)+J(0.00000)	.0008189	.00000
			3	(-7.01971-003)+J(0.00000)	-.0070197	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(8.47977-003)+J(0.00000)	.0084798	.00000
			6	(7.07712-006)+J(0.00000)	.0000071	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(-1.67126-004)+J(0.00000)	-.0001671	.00000
			9	(1.18256-003)+J(0.00000)	.0011826	.00000
			10	(-2.62182-004)+J(0.00000)	-.0002622	.00000
			11	(9.86739-005)+J(0.00000)	.0000987	.00000
			12	(1.31898-005)+J(0.00000)	.0000132	.00000
			13	(-1.29413-003)+J(0.00000)	-.0012941	.00000
			14	(-1.88588-002)+J(0.00000)	-.0188588	.00000
			15	(-7.50489-003)+J(0.00000)	-.0075049	.00000
			16	(-1.86712-003)+J(0.00000)	-.0018671	.00000
			17	(-1.09175-005)+J(0.00000)	-.0000109	.00000
			18	(-1.61482-002)+J(0.00000)	-.0161482	.00000

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F100   LINEAR MODEL     83/.9/45K     2/24/76

(-1.72192+002)+J( 0.00000     )  0.00000        1.00000   1  (-7.46618-003)+J( 0.00000     )  -.0074662     .00000
                                                           2  (-3.00676-003)+J( 0.00000     )  -.0030068     .00000
                                                           3  (-3.03298-002)+J( 0.00000     )  -.0303298     .00000
                                                           4  ( 0.00000     )+J( 0.00000     )   .0000000     .00000
                                                           5  (-9.56187-001)+J( 0.00000     )   .9561872     .00000
                                                           6  (-1.88464-005)+J( 0.00000     )  -.0000188     .00000
                                                           7  ( 1.00000+000)+J( 0.00000     )  1.0000000     .00000
                                                           8  ( 3.43340-004)+J( 0.00000     )   .0003433     .00000
                                                           9  ( 6.39106-003)+J( 0.00000     )   .0063911     .00000
                                                          10  (-2.88154-002)+J( 0.00000     )  -.0288154     .00000
                                                          11  ( 1.30484-002)+J( 0.00000     )   .0130484     .00000
                                                          12  ( 1.69632-003)+J( 0.00000     )   .0016963     .00000
                                                          13  (-3.30669-002)+J( 0.00000     )  -.0330669     .00000
                                                          14  ( 1.45999-002)+J( 0.00000     )   .0145999     .00000
                                                          15  ( 5.73796-003)+J( 0.00000     )   .0057380     .00000
                                                          16  ( 3.27751-002)+J( 0.00000     )   .0327751     .00000
                                                          17  (-1.83591-004)+J( 0.00000     )  -.0001836     .00000
                                                          18  (-7.77991-002)+J( 0.00000     )  -.0777991     .00000

(-5.64891+001)+J( 0.00000     )  0.00000        1.00000   1  (-7.95637-003)+J( 0.00000     )  -.0079564     .00000
                                                           2  (-3.74402-003)+J( 0.00000     )  -.0037440     .00000
                                                           3  ( 5.42611-004)+J( 0.00000     )   .0005426     .00000
                                                           4  ( 0.00000     )+J( 0.00000     )   .0000000     .00000
                                                           5  (-3.32695-002)+J( 0.00000     )  -.0332695     .00000
                                                           6  (-3.94026-003)+J( 0.00000     )  -.0039403     .00000
                                                           7  (-1.31312-001)+J( 0.00000     )  -.1313124     .00000
                                                           8  (-1.52175-003)+J( 0.00000     )  -.0015217     .00000
                                                           9  ( 1.32232-002)+J( 0.00000     )   .0132232     .00000
                                                          10  ( 4.12547-003)+J( 0.00000     )   .0041255     .00000
                                                          11  ( 2.61939-001)+J( 0.00000     )   .2619386     .00000
                                                          12  ( 3.22104-002)+J( 0.00000     )   .0322104     .00000
                                                          13  (-3.72675-002)+J( 0.00000     )  -.0372675     .00000
                                                          14  ( 1.00000+000)+J( 0.00000     )  1.0000000     .00000
                                                          15  ( 3.77953-001)+J( 0.00000     )   .3779535     .00000
                                                          16  ( 1.71482-001)+J( 0.00000     )   .1714821     .00000
                                                          17  (-6.91746-003)+J( 0.00000     )  -.0069175     .00000
                                                          18  (-9.88868-001)+J( 0.00000     )  -.9888676     .00000
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F10C   LINEAR MODEL     83/.9/45K     2/24/76

(-5.06103+001)+J( 0.00000     ) 0.00000        1.00000   1  ( 1.06000-003)+J( 0.00000     )   .0010600       .00000
                                                         2  (-4.55325-005)+J( 0.00000     )  -.0000455       .00000
                                                         3  ( 1.01919-002)+J( 0.00000     )   .0101919       .00000
                                                         4  ( 0.00000     )+J( 0.00000     )   .0000000       .00000
                                                         5  ( 8.07193-003)+J( 0.00000     )  -.0080719       .00000
                                                         6  ( 1.67089-004)+J( 0.00000     )   .0001671       .00000
                                                         7  (-4.67607-002)+J( 0.00000     )  -.0467607       .00000
                                                         8  (-6.79107-003)+J( 0.00000     )  -.0067911       .00000
                                                         9  ( 1.34947-002)+J( 0.00000     )   .0134947       .00000
                                                        10  ( 1.76831-003)+J( 0.00000     )   .0017683       .00000
                                                        11  (-4.32421-002)+J( 0.00000     )  -.0432421       .00000
                                                        12  (-5.26337-003)+J( 0.00000     )  -.0052634       .00000
                                                        13  ( 3.55877-004)+J( 0.00000     )   .0003559       .00000
                                                        14  (-3.79838-002)+J( 0.00000     )  -.0379838       .00000
                                                        15  (-1.42540-002)+J( 0.00000     )  -.0142540       .00000
                                                        16  (-1.28602-002)+J( 0.00000     )  -.0128602       .00000
                                                        17  (-8.60630-003)+J( 0.00000     )  -.0086063       .00000
                                                        18  ( 1.00000+000)+J( 0.00000     )  1.0000000       .00000

(-4.63680+001)+J( 0.00000     ) 0.00000        1.00000   1  (-1.11409-002)+J( 0.00000     )  -.0111409       .00000
                                                         2  ( 6.37626-003)+J( 0.00000     )   .0063763       .00000
                                                         3  ( 1.49169-002)+J( 0.00000     )   .0149169       .00000
                                                         4  ( 0.00000     )+J( 0.00000     )   .0000000       .00000
                                                         5  (-3.88460-003)+J( 0.00000     )  -.0038846       .00000
                                                         6  (-4.80241-003)+J( 0.00000     )  -.0048024       .00000
                                                         7  (-4.65669-002)+J( 0.00000     )  -.0465669       .00000
                                                         8  (-7.55702-003)+J( 0.00000     )  -.0075570       .00000
                                                         9  ( 3.24445-002)+J( 0.00000     )  -.0324445       .00000
                                                        10  ( 1.46409-003)+J( 0.00000     )   .0014641       .00000
                                                        11  (-5.12879-001)+J( 0.00000     )  -.5128786       .00000
                                                        12  (-6.18914-002)+J( 0.00000     )  -.0618914       .00000
                                                        13  (-4.07322-002)+J( 0.00000     )  -.0407322       .00000
                                                        14  ( 1.00000+000)+J( 0.00000     )  1.0000000       .00000
                                                        15  ( 3.72929-001)+J( 0.00000     )   .3729287       .00000
                                                        16  ( 5.96877-002)+J( 0.00000     )   .0596877       .00000
                                                        17  (-2.40901-002)+J( 0.00000     )  -.0240901       .00000
                                                        18  ( 6.39145-001)+J( 0.00000     )   .6391454       .00000
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(-4.48687+001)+J( 0.00000   )  0.00000       1.00000    1  (-1.24496-002)+J( 0.00000   )  -.0124496      .00000
                                                        2  (-1.14761-002)+J( 0.00000   )  -.0114761      .00000
                                                        3  ( 8.54091-003)+J( 0.00000   )   .0085409      .00000
                                                        4  ( 0.00000    )+J( 0.00000   )   .0000000      .00000
                                                        5  (-1.80480-002)+J( 0.00000   )  -.0180480      .00000
                                                        6  (-4.96328-003)+J( 0.00000   )  -.0049633      .00000
                                                        7  ( 8.79318-003)+J( 0.00000   )   .0087932      .00000
                                                        8  (-2.46557-003)+J( 0.00000   )  -.0024656      .00000
                                                        9  ( 2.36135-002)+J( 0.00000   )   .0236135      .00000
                                                       10  (-2.27686-005)+J( 0.00000   )  -.0000228      .00000
                                                       11  (-8.11658-001)+J( 0.00000   )  -.8116584      .00000
                                                       12  (-9.75999-002)+J( 0.00000   )  -.0975999      .00000
                                                       13  (-9.06890-002)+J( 0.00000   )  -.0906890      .00000
                                                       14  ( 1.00000+000)+J( 0.00000   )  1.0000000      .00000
                                                       15  ( 3.71974-001)+J( 0.00000   )   .3719737      .00000
                                                       16  ( 4.43687-002)+J( 0.00000   )   .0443687      .00000
                                                       17  (-1.86215-002)+J( 0.00000   )  -.0186215      .00000
                                                       18  ( 3.82365-001)+J( 0.00000   )   .3823645      .00000

(-2.07060+001)+J( 3.44658+000)  2.09909+001   .98643    1  ( 4.82723-003)+J(-1.56939-003)   .0050759    -18.00996
                                                        2  (-1.43082-003)+J(-3.98318-003)   .0042324   -109.75911
                                                        3  (-3.89054-002)+J(-8.17292-004)   .0389140   -178.79656
                                                        4  ( 0.00000    )+J( 0.00000   )    .0000000       .00000
                                                        5  (-2.46577-002)+J( 3.31787-002)   .0413380    126.61889
                                                        6  ( 7.25472-004)+J(-7.17555-004)   .0010204    -44.68567
                                                        7  (-1.23541-001)+J(-4.49095-003)   .1236228   -177.91811
                                                        8  (-1.53299-002)+J(-2.81118-002)   .0320200   -118.60442
                                                        9  (-3.47056-002)+J( 1.74059-001)   .1774856    101.27631
                                                       10  (-5.16724-002)+J( 7.76619-002)   .0933923    123.74001
                                                       11  (-1.48713-002)+J( 9.24973-002)   .0936852     99.13359
                                                       12  (-1.11528-003)+J( 9.81346-003)   .0098766     96.48371
                                                       13  (-1.21811-002)+J( 5.12365-002)   .0526646    103.37341
                                                       14  (-5.61427-002)+J( 7.77847-002)   .0959295    125.82066
                                                       15  (-1.80931-002)+J( 2.69405-002)   .0324523    123.88511
                                                       16  ( 2.35021-001)+J( 4.20761-002)   .2387580     10.15020
                                                       17  ( 1.00000+000)+J( 0.00000   )   1.0000000       .00000
                                                       18  ( 6.58590-001)+J(-1.71180-002)   .6588122     -1.48889
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(-2.16875+001)+J(0.00000)	0.00000	1.00000	1	(-4.95621-004)+J(0.00000)	-.0004956	.00000
			2	(-3.34921-003)+J(0.00000)	-.0033492	.00000
			3	(1.68231-002)+J(0.00000)	.0168231	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(5.84814-002)+J(0.00000)	.0584814	.00000
			6	(-2.29635-004)+J(0.00000)	-.0002296	.00000
			7	(-1.69995-002)+J(0.00000)	-.0169995	.00000
			8	(-1.86811-002)+J(0.00000)	-.0186811	.00000
			9	(-8.74413-002)+J(0.00000)	-.0874413	.00000
			10	(7.55682-002)+J(0.00000)	.0755682	.00000
			11	(5.09831-002)+J(0.00000)	.0509831	.00000
			12	(5.39769-003)+J(0.00000)	.0053977	.00000
			13	(2.50061-002)+J(0.00000)	.0250061	.00000
			14	(2.23086-002)+J(0.00000)	.0223086	.00000
			15	(7.55512-003)+J(0.00000)	.0075551	.00000
			16	(-1.96368-001)+J(0.00000)	-.1963682	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
			18	(1.20062-001)+J(0.00000)	.1200625	.00000
(-6.58573+000)+J(0.00000)	0.00000	1.00000	1	(1.31927-001)+J(0.00000)	.1319274	.00000
			2	(-1.01277-002)+J(0.00000)	-.0101277	.00000
			3	(1.00000+000)+J(0.00000)	1.0000000	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(3.73139-001)+J(0.00000)	.3731389	.00000
			6	(3.91980-003)+J(0.00000)	.0039198	.00000
			7	(1.04861-001)+J(0.00000)	.1048607	.00000
			8	(2.97552-001)+J(0.00000)	.2975521	.00000
			9	(5.52128-001)+J(0.00000)	.5521282	.00000
			10	(2.55318-001)+J(0.00000)	.2553180	.00000
			11	(-6.20774-002)+J(0.00000)	-.0620774	.00000
			12	(-2.18724-003)+J(0.00000)	-.0021872	.00000
			13	(-7.92658-002)+J(0.00000)	-.0792658	.00000
			14	(-1.14993-001)+J(0.00000)	-.1149932	.00000
			15	(-1.60692-002)+J(0.00000)	-.0160692	.00000
			16	(1.05744-001)+J(0.00000)	.1057440	.00000
			17	(8.21170-001)+J(0.00000)	.8211700	.00000
			18	(4.26539-001)+J(0.00000)	.4265390	.00000

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(-5.61840-001)+J(0.00000)	0.00000	1.00000	1	(8.63503-001)+J(0.00000)	.8635034	.00000
			2	(9.53952-001)+J(0.00000)	.9539518	.00000
			3	(1.86405-001)+J(0.00000)	.1864049	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(4.05987-002)+J(0.00000)	.0405987	.00000
			7	(4.23660-001)+J(0.00000)	.4236602	.00000
			8	(5.25953-001)+J(0.00000)	.5259529	.00000
			9	(4.10466-001)+J(0.00000)	.4104662	.00000
			10	(9.79211-001)+J(0.00000)	.9792114	.00000
			11	(8.48721-002)+J(0.00000)	.0848721	.00000
			12	(4.78673-001)+J(0.00000)	.4786731	.00000
			13	(7.37588-003)+J(0.00000)	.0073759	.00000
			14	(-5.24351-002)+J(0.00000)	-.0524351	.00000
			15	(-6.38666-002)+J(0.00000)	-.0638666	.00000
			16	(-1.45792-001)+J(0.00000)	-.1457920	.00000
			17	(4.30380-001)+J(0.00000)	.4303796	.00000
			18	(3.41774-002)+J(0.00000)	.0341774	.00000
(-7.14144-001)+J(0.00000)	0.00000	1.00000	1	(-8.68830-001)+J(0.00000)	-.8688295	.00000
			2	(-8.03930-001)+J(0.00000)	-.8039295	.00000
			3	(-3.22478-001)+J(0.00000)	-.3224785	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-8.90021-001)+J(0.00000)	-.8900207	.00000
			6	(9.50008-003)+J(0.00000)	.0095001	.00000
			7	(-4.44167-001)+J(0.00000)	-.4441668	.00000
			8	(-5.40532-001)+J(0.00000)	-.5405319	.00000
			9	(-4.97636-001)+J(0.00000)	-.4976364	.00000
			10	(-8.90734-001)+J(0.00000)	-.8907337	.00000
			11	(-8.30501-002)+J(0.00000)	-.0830501	.00000
			12	(1.00000+000)+J(0.00000)	1.0000000	.00000
			13	(-1.29082-002)+J(0.00000)	-.0129082	.00000
			14	(-1.79970-002)+J(0.00000)	-.0179970	.00000
			15	(-2.46328-002)+J(0.00000)	-.0246328	.00000
			16	(4.88030-002)+J(0.00000)	.0488030	.00000
			17	(-5.20052-001)+J(0.00000)	-.5200518	.00000
			18	(-9.32892-002)+J(0.00000)	-.0932892	.00000

```
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(-1.62380+001)+J( 0.00000    )  0.00000       1.00000   1  ( 3.84943-003)+J( 0.00000      )   .0038494      .00000
                                                        2  ( 3.24928-003)+J( 0.00000      )   .0032493      .00000
                                                        3  ( 4.06235-002)+J( 0.00000      )   .0406235      .00000
                                                        4  ( 0.00000     )+J( 0.00000      )   .0000000      .00000
                                                        5  ( 1.99239-002)+J( 0.00000      )   .0199239      .00000
                                                        6  ( 1.65456-003)+J( 0.00000      )   .0016546      .00000
                                                        7  ( 8.83190-004)+J( 0.00000      )   .0008832      .00000
                                                        8  (-1.92358-002)+J( 0.00000      )  -.0192358      .00000
                                                        9  ( 1.91304-001)+J( 0.00000      )   .1913035      .00000
                                                       10  (-7.56214-002)+J( 0.00000      )  -.0756214      .00000
                                                       11  (-1.17344-001)+J( 0.00000      )  -.1173439      .00000
                                                       12  (-1.12873-002)+J( 0.00000      )  -.0112873      .00000
                                                       13  (-7.96544-002)+J( 0.00000      )  -.0796544      .00000
                                                       14  (-1.20167-001)+J( 0.00000      )  -.1201671      .00000
                                                       15  (-3.79890-002)+J( 0.00000      )  -.0379890      .00000
                                                       16  (-4.01576-001)+J( 0.00000      )  -.4015755      .00000
                                                       17  ( 1.00000+000)+J( 0.00000      )  1.0000000      .00000
                                                       18  (-1.30504-001)+J( 0.00000      )  -.1305042      .00000

(-2.13242+000)+J( 0.00000    )  0.00000       1.00000   1  (-3.79039-001)+J( 0.00000      )  -.3790392      .00000
                                                        2  ( 2.76686-002)+J( 0.00000      )   .0276686      .00000
                                                        3  (-3.13268-001)+J( 0.00000      )  -.3132682      .00000
                                                        4  ( 0.00000     )+J( 0.00000      )   .0000000      .00000
                                                        5  ( 1.25872-002)+J( 0.00000      )   .0125872      .00000
                                                        6  ( 4.84226-004)+J( 0.00000      )   .0004842      .00000
                                                        7  ( 6.02249-002)+J( 0.00000      )   .0602249      .00000
                                                        8  (-2.81785-001)+J( 0.00000      )  -.2817846      .00000
                                                        9  (-3.14960-001)+J( 0.00000      )  -.3149599      .00000
                                                       10  (-1.67313-001)+J( 0.00000      )  -.1673133      .00000
                                                       11  (-1.10023-001)+J( 0.00000      )  -.1100227      .00000
                                                       12  ( 2.86648-002)+J( 0.00000      )   .0286648      .00000
                                                       13  (-1.00020-001)+J( 0.00000      )  -.1000202      .00000
                                                       14  (-1.15398-001)+J( 0.00000      )  -.1153977      .00000
                                                       15  ( 1.00000+000)+J( 0.00000      )  1.0000000      .00000
                                                       16  (-2.20169-001)+J( 0.00000      )  -.2201688      .00000
                                                       17  (-3.42224-001)+J( 0.00000      )  -.3422243      .00000
                                                       18  (-9.81506-002)+J( 0.00000      )  -.0981506      .00000
```

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F100   LINEAR MODEL      83/.9/45K      2/24/76

(-1.72903+001)+J( 0.00000     )  0.00000        1.00000   1  ( 4.03358-003)+J( 0.00000     )   .0040336      .00000
                                                          2  ( 4.47966-004)+J( 0.00000     )   .0004480      .00000
                                                          3  ( 2.18033-002)+J( 0.00000     )   .0218033      .00000
                                                          4  ( 0.00000     )+J( 0.00000     )   .0000000      .00000
                                                          5  ( 3.52794-003)+J( 0.00000     )   .0035279      .00000
                                                          6  ( 8.86331-004)+J( 0.00000     )   .0008863      .00000
                                                          7  (-4.17355-002)+J( 0.00000     )  -.0417355      .00000
                                                          8  (-5.72831-003)+J( 0.00000     )  -.0057283      .00000
                                                          9  ( 1.37988-001)+J( 0.00000     )   .1379881      .00000
                                                         10  (-4.10104-002)+J( 0.00000     )  -.0410104      .00000
                                                         11  (-5.63462-002)+J( 0.00000     )  -.0563462      .00000
                                                         12  (-5.55057-003)+J( 0.00000     )  -.0055506      .00000
                                                         13  (-3.66293-002)+J( 0.00000     )  -.0366293      .00000
                                                         14  (-6.85664-002)+J( 0.00000     )  -.0685664      .00000
                                                         15  (-2.20742-002)+J( 0.00000     )  -.0220742      .00000
                                                         16  (-2.41406-001)+J( 0.00000     )  -.2414061      .00000
                                                         17  ( 1.00000+000)+J( 0.00000     )  -1.0000000     .00000
                                                         18  ( 3.62385-002)+J( 0.00000     )   .0362385      .00000

(-1.88370+000)+J( 0.00000     )  0.00000        1.00000   1  ( 1.33180-001)+J( 0.00000     )   .1331802      .00000
                                                          2  (-5.35343-002)+J( 0.00000     )  -.0535343      .00000
                                                          3  (-1.24890-002)+J( 0.00000     )  -.0124890      .00000
                                                          4  ( 0.00000     )+J( 0.00000     )   .0000000      .00000
                                                          5  (-1.38026-001)+J( 0.00000     )  -.1380264      .00000
                                                          6  (-2.67053-002)+J( 0.00000     )  -.0267053      .00000
                                                          7  (-1.86884-001)+J( 0.00000     )  -.1868842      .00000
                                                          8  ( 9.75705-002)+J( 0.00000     )   .0975705      .00000
                                                          9  ( 2.53534-002)+J( 0.00000     )   .0253534      .00000
                                                         10  ( 2.68420-002)+J( 0.00000     )   .0268420      .00000
                                                         11  ( 9.38602-002)+J( 0.00000     )   .0938602      .00000
                                                         12  (-3.20967-002)+J( 0.00000     )  -.0320967      .00000
                                                         13  ( 9.56427-002)+J( 0.00000     )   .0956427      .00000
                                                         14  ( 9.40393-002)+J( 0.00000     )   .0940393      .00000
                                                         15  ( 1.00000+000)+J( 0.00000     )  -1.0000000     .00000
                                                         16  ( 1.21712-001)+J( 0.00000     )   .1217120      .00000
                                                         17  ( 2.21427-002)+J( 0.00000     )   .0221427      .00000
                                                         18  (-1.91994-002)+J( 0.00000     )  -.0191994      .00000
```

```
F100   LINEAR MODEL     83/.9/45K     2/24/76

(-1.00000+001)+J( 0.00000     )  0.00000        1.00000   1  ( 1.15548-001)+J( 0.00000    )   .1155482       .00000
                                                          2  ( 3.43644-003)+J( 0.00000    )   .0034364       .00000
                                                          3  ( 6.90574-001)+J( 0.00000    )   .6905738       .00000
                                                          4  (-7.14935-001)+J( 0.00000    )  -.7149348       .00000
                                                          5  ( 5.51412-002)+J( 0.00000    )   .0551412       .00000
                                                          6  ( 9.56526-003)+J( 0.00000    )   .0095653       .00000
                                                          7  (-3.79054-001)+J( 0.00000    )  -.3790537       .00000
                                                          8  ( 3.08301-001)+J( 0.00000    )   .3083012       .00000
                                                          9  ( 5.04951-001)+J( 0.00000    )   .5049515       .00000
                                                         10  ( 3.61742-001)+J( 0.00000    )   .3617421       .00000
                                                         11  (-3.35781-001)+J( 0.00000    )  -.3357811       .00000
                                                         12  (-2.39525-002)+J( 0.00000    )  -.0239525       .00000
                                                         13  (-3.19820-001)+J( 0.00000    )  -.3198200       .00000
                                                         14  (-4.26645-001)+J( 0.00000    )  -.4266445       .00000
                                                         15  (-1.07013-001)+J( 0.00000    )  -.1070133       .00000
                                                         16  (-2.78388-001)+J( 0.00000    )  -.2783881       .00000
                                                         17  ( 1.00000+000)+J( 0.00000    )  1.0000000       .00000
                                                         18  (-1.19112-002)+J( 0.00000    )  -.0119112       .00000
```

D.3 SELECTED REDUCED ORDER MODELS

D.3.1 Definition of Reduction Matrices (see Chapter IV)

Modal Decomposition

$$\delta\dot{x} = F\delta x + G\delta u$$

$$\delta x = Tz$$

$$FT = T\Lambda$$

where

Λ is block diagonal

Partition:

$$\begin{bmatrix} \dot{z}_1 \\ \hdashline \dot{z}_2 \end{bmatrix} = \begin{bmatrix} \Lambda_1 & \vdots & 0 \\ \hdashline 0 & \vdots & \Lambda_2 \end{bmatrix} \begin{bmatrix} z_1 \\ \hdashline z_2 \end{bmatrix} + \begin{bmatrix} \Xi_1 \\ \hdashline \Xi_2 \end{bmatrix} u$$

$$\begin{bmatrix} \delta x_1 \\ \hdashline \delta x_2 \end{bmatrix} = \begin{bmatrix} T_{11} & \vdots & T_{12} \\ \hdashline T_{21} & \vdots & T_{22} \end{bmatrix} \begin{bmatrix} z_1 \\ \hdashline z_2 \end{bmatrix}$$

$$\delta y = [H_1 \quad H_2] \begin{bmatrix} \delta x_1 \\ \hdashline \delta x_2 \end{bmatrix} + D\delta u$$

Reduction:

$$\delta \dot{x}_1 = F_r \delta x_1 + G_r \delta u$$

$$\delta y = H_r \delta x_1 + D_r \delta u$$

$$\delta x_2 = H^* \delta x_1 + D^* \delta u$$

Table D.9 shows the equivalence of the above matrix names and the listing.

D.3.2 Normalization

Matrices are normalized as in Section D.2. The eigensystem shown in not normalized and matrices listed at the end are the final reduced, unnormalized system.

D.3.3 Case Index

Table D.10 lists the cases included.

Table D.9

Index of Reduction Matrices
(In order of appearance in printout)

MATRIX	TITLE
Λ_1	LAMBDA1
T_{11}	T_{11}
Ξ_1	XI1
T_{21}	T_{21}
T_{22}	T_{22}
Λ_2	LAMBDA2
T_{12}	T_{12}
H_1	H_1
H_2	H_2
Ξ_2	XI2
T_{11}^{-1}	T_{11} INVERSE
F_r	FT
Λ_2^{-1}	LAMBDA2 INVERSE
G_r	GR
H^*	H^*
H_r	HR
D^*	D^*
D_r	DR
F,G,H,D	Unnormalized Output

Table D.10

Index to Model Reductions

CASE	PLA (DEG)	ALTITUDE (FT)	MACH NO.
1	83	45,000	0.9
2	83	30,000	0.9
3	83	0	0
4	83	0	1.2
5	20	30,000	0.9
6	20	0	0
7	52	0	0

CASE 1

```
THE REDUCED MATRICES FR.GR.HR.DR WILL BE SAVED FOR OPTSYS ON FILE 12
INTERMEDIATE DATA WILL BE READ FROM RECORD NO.  2 OF FILE 10

THERE WILL BE 12 EIGENVALUES ELIMINATED. THE TOLERANCE LEVEL FOR ELIMINATION IS       .100
  1 OF THESE EIGENVALUES ARE COMPLEX. TO BE ELIMINATED ARE--
( -.250000+000,  .000000     )
( -.592000+003,  .000000     )
( -.564000+002,  .000000     )
( -.506000+002,  .000000     )
( -.483000+002,  .000000     )
( -.448000+002,  .000000     )
( -.207000+002,  .344000+001)
( -.216000+002,  .000000     )
( -.710000+000,  .000000     )
( -.162000+002,  .000000     )
( -.172000+002,  .000000     )
( -.213000+001,  .000000     )

THE IDENTIFYING TITLE FOR FR.GR.HR.DR ON OPTSYS OUPUT =REDUCED MATRICES     .9/45K   83      FIFTH ORDER
```

F100 LINEAR MODEL .9/45K 83 3/5/76

LAMBDA1

	1	2	3	4	5
1	-1.7219+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-6.5857+000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-5.6184-001	0.0000	0.0000
4	0.0000	0.0000	0.0000	-1.8837+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

T11

	1	2	3	4	5
1	-7.4662-003	1.3193-001	8.6350-001	1.3318-001	1.1555-001
2	-3.0068-003	-1.0125-002	9.5395-001	-5.3534-002	3.4364-003
3	-3.0330-002	1.0000+000	1.8640-001	-1.2489-002	6.9057-001
4	0.0000	0.0000	0.0000	0.0000	-7.1493-001
5	9.5619-001	3.7314-001	1.0000+000	-1.3803-001	5.5141-002

XT1

	1	2	3	4	5
1	-3.5752-001	3.4308+000	3.4263-002	5.8523-001	-2.0373+002
2	9.9405+000	-6.2729+000	1.4952-002	-1.7632-002	-4.4872+000
3	2.5448-001	1.9406-001	-5.5715-004	-7.7295-004	5.1628-002
4	7.7338-001	1.5482+000	-1.1421-002	1.0983-002	1.7148-002
5	-1.3987+001	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL .9/05K 83 3/5/76

T21

	1	2	3	4	5
1	-1.8836-005	3.9198-003	4.0599-002	-2.6705-002	9.5653-003
2	1.0000+000	1.0486-001	4.2366-001	-1.8688-001	-3.7905-001
3	3.2334-004	2.9755-001	5.2595-001	9.7571-002	3.0830-001
4	6.3911-003	5.5213-001	4.1047-001	2.5353-002	5.0495-001
5	-2.8815-002	2.5532-001	9.7921-001	2.6842-002	3.6174-001
6	1.3048-002	-6.2077-002	8.4672-002	9.3860-002	-3.3576-001
7	1.6963-003	-2.1872-003	4.7867-001	-3.2097-002	-2.3953-002
8	-3.3067-002	-7.9266-002	7.3754-003	9.5643-002	-3.1982-001
9	1.4600-002	-1.1409-001	-5.2435-002	9.4039-002	-4.2664-001
10	5.7380-003	-1.6069-002	-6.3867-002	1.0000+000	-1.0701-001
11	3.2775-002	1.0574-001	-1.4579-001	1.2171-001	-2.7839-001
12	-1.8359-004	3.2117-001	4.3036-001	2.2143-002	1.0000+000
13	-7.7799-002	4.2654-001	3.4177-002	-1.9199-002	-1.1911-002

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	7.0771-006	-3.9405-003	1.6709-004	-4.8024-003	-4.9633-003	-2.6968-003	8.9589-004	-2.2963-004	9.5001-003
2	0.0000	1.0000+000	-1.3131-001	-4.6761-002	-4.6567-002	8.7932-003	3.0287-001	1.6370-001	-1.6999-002	-4.4417-001
3	0.0000	-1.6713-004	-1.5217-003	-6.7911-003	-7.5570-003	-2.4656-003	3.5719-003	8.9101-002	-1.8681-002	-5.4053-001
4	0.0000	1.1626-003	1.3223-002	1.3495-002	3.2445-002	2.3614-002	3.0148-001	-3.9169-001	-8.7441-002	-4.9764-001
5	0.0000	-2.6218-004	4.1255-003	1.7683-003	1.4641-003	-2.2769-005	2.2535-001	-1.2985-001	7.5568-002	-8.9073-001
6	0.0000	9.8674-005	2.6194-001	-4.3242-002	-5.1288-001	-8.1166-001	1.5129-001	-2.1256-001	5.0983-002	-8.3050-002
7	0.0000	1.3190-005	3.2210-002	-5.2634-003	-6.1891-002	-9.7600-002	1.4897-002	-2.3122-002	5.3977-003	1.0000+000
8	0.0000	-1.2941-003	-3.7268-002	3.5588-004	-4.0732-002	-9.0689-002	9.3650-002	-1.1287-001	2.5006-002	-1.2908-002
9	0.0000	-1.8859-002	1.0000+000	-3.7984-002	1.0000+000	1.0000+000	2.3616-001	-1.2489-001	2.2309-002	-1.7997-002
10	0.0000	-7.5049-003	3.7795-001	-1.4254-002	3.7293-001	3.7197-001	7.8420-002	-4.4923-002	7.5551-003	-2.4633-002
11	0.0000	-1.8671-003	1.7148-001	-1.2860-002	5.9688-002	4.4369-002	-5.3478-001	-3.9512-001	-1.9637-001	4.8803-002
12	0.0000	-1.0918-005	-6.9175-003	-8.6063-003	-2.4090-002	-1.8622-002	-2.4964+000	-1.2343+000	1.0000+000	-5.2005-001
13	0.0000	-1.6148-002	-9.8647-001	1.0000+000	6.3915-001	3.8236-001	-1.6653+000	-7.7015-001	1.2006-001	-9.3289-002

T22

	11	12	13
1	1.6546-003	8.8633-004	4.8423-004
2	8.8319-004	-4.1736-002	6.0225-002
3	-1.9236-002	-5.7283-003	-2.8178-001
4	1.9130-001	1.3799-001	-3.1496-001
5	-7.5621-002	-4.1010-002	-1.6731-001
6	-1.1734-001	-5.6346-002	-1.1002-001
7	-1.1287-002	-5.5506-003	2.8665-002
8	-7.9654-002	-3.6629-002	-1.0002-001
9	-1.2017-001	-6.8566-002	-1.1540-001
10	-3.7989-002	-2.2074-002	1.0000+000
11	-4.0156-001	-2.4141-001	-2.2017-001
12	1.0000+000	1.0000+000	-3.4222-001
13	-1.3059-001	3.6238-002	-9.8151-002

F100 LINEAR MODEL .9/45K 93 3/5/76

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-5.9201+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-5.6489+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-5.0610+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-4.6368+001	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-4.4869+001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.0706+001	3.4466+000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-3.4466+000	-2.0706+001	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.1687+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-7.1414-001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-1.6236+001	0.0000	0.0000
12	0.0000	-1.7290+001	0.0000
13	0.0000	0.0000	-2.1324+000

T12

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-1.9404-003	-7.9564-003	1.0600-003	-1.1141-002	-1.2450-002	-1.3988-002	-2.0403-003	-4.9562-004	-8.6883-001
2	0.0000	8.1885-004	-3.7440-003	-4.5532-005	6.3765-003	1.1476-002	-1.3444-003	1.1710-002	-3.3492-003	-8.0393-001
3	0.0000	-7.0197-003	5.4261-004	1.0192-002	1.4917-002	8.5409-003	9.6116-002	5.0061-002	1.6823-002	-3.2248-001
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	9.4796-003	-3.3269-002	8.0719-003	-3.8846-003	-1.8048-002	1.0251-001	-5.2394-002	5.8481-002	-8.9002-001

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T12

	11	12	13
1	3.8404-003	4.0336-003	-3.7904-001
2	3.2093-003	4.4797-004	2.7569-002
3	4.0623-002	2.1803-002	-3.1327-001
4	0.0000	0.0000	0.0000
5	1.0924-002	3.5279-003	1.2587-002

H1

	1	2	3	4	5
1	2.6104-001	-8.5445-001	-1.8575-001	-4.5916-001	2.7578-001
2	6.9558-001	3.5016-004	-2.5011-003	9.8214-003	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	1.3727+001	6.4099-001	-4.7539+000	2.4292-002	4.2481-002
5	1.2724+000	1.1586+001	5.1152+000	9.0031-001	-7.2306+000
6	1.8573-001	-3.5102-001	-6.1926-001	-7.9583-002	4.9804-002
7	1.0331-001	6.1723-002	-1.5879-001	-1.8241-002	-2.2531-003

H2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	1.0609+000	9.1188-001	1.3189-001	-1.2155-002	2.0179-001	8.7245-002	-5.3205-001	7.2107-002	7.3443-002
2	0.0000	0.0000	-1.5008-004	3.5025-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000
4	0.0000	1.4786-001	-3.9772-001	5.8519-001	8.4631-002	1.0284-001	9.1097-002	5.8182-002	9.1427-002	9.4959-002
5	0.0000	-1.6320-001	-6.4331+000	-6.3354-001	-9.2582-002	-1.1307-001	-1.0180-001	-6.3368-002	-1.0155-001	-1.0500-001
6	0.0000	1.9400-002	3.3755-001	1.6677-001	1.1137-002	1.3235-002	1.2235-002	7.6200-003	1.2220-002	1.2411-002
7	0.0000	5.1630-003	3.0515-002	5.9224-002	2.8976-003	3.4693-003	3.2664-003	1.9077-003	3.2678-003	3.2076-003

H2

	11	12	13
1	7.1409-001	2.3067-001	7.1559-002
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	9.1768-002	9.2332-003	9.0668-002
5	1.0204-001	-1.0370-002	-1.0023-001
6	1.2305-002	1.2794-003	1.2233-002
7	3.2785-003	2.8514-004	3.2555-003

T100 LINEAR MODEL .9/45K 83 3/5/76

XT2

	1	2	3	4	5
1	9.7142-002	7.4659-002	-2.0655-004	2.2425-004	1.3852-001
2	-3.7215+000	2.1220+001	-3.4580-001	-1.2846+000	9.8585-001
3	[illegible]	1.6521+001	4.0181-002	8.5703-001	-2.3396+002
4	1.0642+002	4.5350+001	5.5246-002	2.1413+000	-5.2492+002
5	-1.6719+002	-6.6488+001	-1.6653-001	-2.9877+000	6.9845+002
6	1.2165+002	4.8690+001	1.1734-001	2.1242+000	-4.8651+002
7	1.0397+001	7.4704+000	4.0155-002	1.2459-001	-3.5528+000
8	5.7177+000	1.7233+000	6.3152-002	-7.1150-003	-3.1256+000
9	3.8635-001	-1.3641+001	-1.2012-001	1.7833-001	-4.5636+001
10	1.2453-001	1.0910-001	-3.9347-004	1.2339-003	3.1105-001
11	-6.6756+001	-7.3285+001	-5.7406-001	-4.3450-001	-9.8557+001
12	1.0724+002	1.1349+002	8.6986-001	5.6319-001	1.3705+002
13	-1.8254-001	-1.1224+000	1.0921-002	-1.0286-002	8.3022-001

T11 INVERSE

	1	2	3	4	5
1	4.5953-001	-1.4064+000	-4.5936-001	-2.9672-001	1.0304+000
2	2.4770-002	-2.4654-001	9.8282-001	9.5451-001	3.0593-002
3	3.1026-001	7.7024-001	-3.4530-002	2.0782-002	3.7494-003
4	5.4982+000	-4.8287+000	-7.7544-001	1.1664-001	3.1510-003
5	0.0000	0.0000	0.0000	-1.3987+000	0.0000

FQ

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	-3.6061-001	-7.5613-001	-1.2332+000	3.6608-001	1.2955+000
SNCOM	6.2773-001	-1.6443+000	-2.3196-001	-4.1270-002	5.3383-001
PT7M	2.3336+000	-5.9154+000	-8.8862+000	1.8241+000	5.1796+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	-7.4465+001	2.3047+002	7.3034+001	4.7299+001	-1.6973+002

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UNNORMALIZED EIGENSYSTEM,

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.72192+002)+J(0.00000)	0.00000	1.00000	1	(-7.81727-001)+J(0.00000)	-.7817274	.00000
			2	(-3.98969-001)+J(0.00000)	-.3989693	.00000
			3	(-3.52501-003)+J(0.00000)	-.0035250	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.88370+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-5.09420-001)+J(0.00000)	-.5094204	.00000
			3	(-1.04093-004)+J(0.00000)	-.0001041	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-1.03520-002)+J(0.00000)	-.0103520	.00000
(-6.58573+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-9.72878-002)+J(0.00000)	-.0972878	.00000
			3	(8.41394-003)+J(0.00000)	.0084139	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.82511-002)+J(0.00000)	.0282511	.00000
(-5.61640-001)+J(0.00000)	0.00000	1.00000	1	(7.14255-001)+J(0.00000)	.7142552	.00000
			2	(1.00000+000)+J(0.00000)	1.0000000	.00000
			3	(1.71152-004)+J(0.00000)	.0001712	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(8.26208-003)+J(0.00000)	.0082621	.00000
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(-5.90192-001)+J(0.00000)	-.5901923	.00000
			2	(-2.22445-002)+J(0.00000)	-.0222445	.00000
			3	(-3.91539-003)+J(0.00000)	-.0039154	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-2.81324-003)+J(0.00000)	-.0028132	.00000

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LAMBDA2 INVERSE

	1	2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.4892-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.7703-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-1.9759-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-2.1567-002	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-2.2287-002	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.6993-002	-7.8221-003	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.8221-003	-4.6993-002	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.6110-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.4003+000
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2 INVERSE

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-6.1584-002	0.0000	0.0000
12	0.0000	-5.7836-002	0.0000
13	0.0000	0.0000	-4.6895-001

GR

	WFMRH	ANMTX	CTVV	RCVV	BLC
SNFAN	-6.5504-002	-1.0301-001	-2.7750-003	-3.2618-003	2.8534-001
SNCOM	8.8873-003	1.9113-002	1.4052-003	-4.5590-003	5.7858-001
PT7M	-1.6153-001	-5.3386+000	8.3741-003	-2.7330-002	-3.4075-001
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	-8.0577+000	-5.5305+000	-1.2639-001	5.7571-001	-1.9632+002

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H*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	-1.3415-001	1.5928-001	2.3168-002	-1.1903-002	1.6857-004
SNCOM	-4.3396-001	-2.0348-001	-2.2601-001	3.2057-001	1.0346+000
PT7M	7.0717-001	-1.3986-001	1.9846-001	-1.2500-001	1.1736-002
WFCOM	2.8336-001	4.9628-002	5.0587-001	-1.6969-001	2.5095-002
PT3	4.4448-001	6.1220-001	2.0954-001	-2.3024-001	-1.8125-002
FTIT	5.6685-001	-3.2089-001	-1.4272-001	4.1925-001	1.2160-002
PT45	-2.7235-002	5.2183-001	5.4316-003	3.7116-002	3.3746-003
TT25H	5.1099-001	-3.9010-001	-1.3713-001	3.9280-001	-3.6169-002
TT25C	5.0464-001	-4.8666-001	-1.9084-001	4.9254-001	1.1626-002
TT3	5.4806+000	-4.8820+000	-7.9167-001	2.4795-001	8.3324-003
TT4PHI	6.4164-001	-7.7217-001	-4.7438-004	4.9176-001	3.6844-002
TT4PLO	2.7553-001	2.2387-002	7.7512-001	-6.0333-001	2.6616-002
TT4	-1.2014-001	1.2329-001	4.6866-001	4.4535-001	-6.7049-002

HP

	FTIT	PT45	TT25H	TT25C	TT3
FNMX	1.2570+000	-1.9597+000	-1.6253-004	-6.9790-002	1.4594+000
WFAN	6.2558-001	3.8619-004	-2.3537-003	9.7807-003	7.0283-006
TT4	5.1099-001	-3.9010-001	-1.3713-001	3.9280-001	-3.6169-002
SMAF	1.4286+001	1.6303-001	-4.6177+000	2.2049-001	2.0280-001
SMHC	-4.2013+000	1.3076+001	3.6073+000	1.5403+000	-7.4880+000
DP25QT	5.5978-001	-4.6373-001	-4.7836-001	-1.1745-001	7.8178-002
DP25SC	1.6453-001	4.1261-002	-1.2549-001	-2.3498-002	4.8396-003

D*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	3.9607-001	3.2825-001	-1.0868-003	1.1683-003	5.4837-001
SNCOM	-2.7052-002	4.1208-002	-1.4375-003	-1.9737-003	-2.6390-001
PT7M	6.6354-002	4.3124-002	1.0042-003	-8.9155-005	1.4273-001
WFCOM	1.0643-001	2.3378-001	1.5699-004	8.3916-004	1.6894-001
PT3	1.6321-001	9.2043-002	6.0984-004	2.6359-003	2.3626-003
FTIT	-5.4569-002	4.1283-002	9.2887-004	-5.8599-004	6.1172-001
PT45	2.3475-001	2.1957-001	-6.7150-004	2.3347-003	6.8505-001
TT25H	1.2910-002	5.0035-002	8.5118-004	-6.1235-004	6.7236-001
TT25C	-5.2737-002	4.9519-002	7.1964-004	-9.6409-004	5.5076-001
TT3	-1.5647-001	-1.5328+000	1.4560-002	-1.3865-002	1.3905+000
TT4PHI	-1.5774-001	1.1097-001	1.0912-003	-1.2191-003	9.3546-001
TT4PLO	4.2662-001	4.4610-001	-4.7205-005	1.2604-003	4.2635-001
TT4	-1.6224-001	1.9693-001	-1.1745-003	1.1890-003	4.9121-001

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DP

	WFNBH	ANMTX	CTVV	RCVV	BLC
FNMX	4.8560-003	2.3055-001	3.1277-003	-4.2815-003	1.1679+000
WFAN	2.7985-005	9.3650-003	2.9486-003	2.4541-005	2.5347-002
TT4	1.2910-002	5.0035-002	8.5118-004	-6.1235-004	6.7236-001
SMAF	1.8175-002	5.0733-001	5.1790-003	3.9598-003	4.1607+000
SMHC	-4.7634-001	-3.8485-001	-7.3844-003	-4.4764-002	-2.7738+000
DP25CT	3.8102-002	7.9374-002	1.9014-003	-9.5661-004	2.6329-001
DP25SC	7.7345-003	2.5445-002	6.7143-004	1.9470-004	6.0645-002

```
@ELT,IL     KEM*E100ALT,PH3-09-45K-5
PROCESSED BY UNIVAC 1100 SERIES FLT PROCESSOR LEVEL W8 AT 3:04:43 PM ON FRIDAY, MARCH 5, 1976  (CREATING CYCLE 0)

 1.   F                         REDUCED MATRICES      .9/45K   83     FIFTH ORDER
 2.     -.9606+00 -.5966+00 -.1111+04  .1337+01  .1297+03
 3.      .7955+00 -.1644+01 -.2648+03 -.1910+00  .6773+02
 4.      .2590-02 -.5181-02 -.6886+01  .7394-02  .5756+00
 5.      .0000     .0000     .0000    -.1000+02  .0000
 6.     -.7435+00  .1816+01  .6572+03  .1725+01 -.1697+03
 7.   G                         REDUCED MATRICES      .9/45K   83     FIFTH ORDER
 8.     -.2392+00 -.3610+03 -.2723+02 -.8001+01  .2800+04
 9.      .4113-01  .8488+02  .1747+02 -.1417+02  .7194+04
10.     -.6548-03 -.2077+02  .9120-01 -.7441-01 -.3711+01
11.      .1000+02  .0000     .0000     .0000     .0000
12.     -.2939+00 -.1936+03 -.1239+02  .1411+02 -.1924+05
13.   HY                        REDUCED MATRICES      .9/45K   83     FIFTH ORDER
14.      .3706+00 -.4559+00 -.4317-01 -.7515-01  .4308+02
15.      .4325-02  .1905-05 -.1318-01  .2221-03  .4375-05
16.      .1405+00 -.9004-01 -.3614+02  .4196+00 -.1059+01
17.      .2068-03  .1862-05 -.6021-01  .1165-04  .2939-03
18.     -.6204-04  .1524-03  .4799-01  .8306-04 -.1107-01
19.      .5705-04 -.3729-04 -.4392-01 -.4372-04  .7977-03
20.      .1677-04  .3318-05 -.1152-01 -.8746-05  .4938-04
21.   DY                        REDUCED MATRICES      .9/45K   83     FIFTH ORDER
22.      .5229-02  .2362+03  .9048+01 -.3097+01  .3379+04
23.      .6354-06  .2040+00  .1799+00  .3743-03  .1546+01
24.      .1379-01  .5129+02  .2443+01 -.4394+00  .1930+04
25.      .9607-06  .2573-01  .7355-03  .1406-03  .5909+00
26.     -.2569-04 -.1991-01 -.1070-02 -.1621-02 -.4019+00
27.      .1418-04  .2856-01  .1901-02 -.2397-03  .2633+00
28.      .2697-05  .9687-02  .6714-03  .4867-04  .6065-01
```

CASE 2

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THE REDUCED MATRICES FR,GR,HR,DR WILL BE SAVED FOR OPTSYS ON FILE 12
INTERMEDIATE DATA WILL BE READ FROM RECORD NO.  8 OF FILE 10

THERE WILL BE  9 EIGENVALUES ELIMINATED. THE TOLERANCE LEVEL FOR ELIMINATION IS      .100
  3 OF THESE EIGENVALUES ARE COMPLEX. TO BE ELIMINATED ARE--
( -.250000+000,  .000000     )
( -.400800+003,  .000000     )
( -.431000+002,  .323000+002)
( -.500000+002,  .000000     )
( -.391000+002,  .000000     )
( -.550000+000,  .000000     )
( -.150000+002, -.726000+001)
( -.226000+002,  .450000+000)
( -.173000+002,  .000000     )

THE IDENTIFYING TITLE FOR FR,GR,HR,DR ON OPTSYS OUPUT =REDUCED MATRICES     .9/30K   83     FIFTH ORDER
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F100 LINEAR MODEL .9/30K A3 3/9/76

LAMBDA1

	1	2	3	4	5
1	-2.1397+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.7691+000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-2.1084+000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-9.7423+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

T11

	1	2	3	4	5
1	-1.0633-002	1.0000+000	1.0000+000	6.1762-002	6.1056-002
2	-2.1103-003	1.4306-001	-8.3926-003	4.1560-002	4.4100-002
3	-1.4893-002	-2.1037-001	-1.8135-001	1.0000+000	9.9686-001
4	0.0000	0.0000	0.0000	0.0000	-4.0182-002
5	6.2039-001	-4.8883-001	-6.6546-001	3.0734-001	2.9534-001

XT1

	1	2	3	4	5
1	-1.5110+001	3.3401+001	-2.6151-001	6.0436-002	-5.1850+002
2	2.3812+000	1.5865+000	8.6194-005	-4.5755-002	-4.1443+000
3	-2.5401+000	-1.3064+000	-5.5174-003	5.7571-002	4.0466+000
4	2.4712+002	-7.0765+000	-1.2034-003	-2.7869-002	-9.4846+000
5	-3.4887+002	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL .9/30K A3 3/9/76

T21

	1	2	3	4	5
1	-2.7148-005	-1.1580-001	-9.8612-002	-2.5124-003	-2.0782-003
2	1.0000+000	-5.0955-002	-1.0729-001	6.0216-001	5.9850-001
3	6.3971-003	4.6673-001	4.8695-001	7.2369-002	6.3671-002
4	3.6610-003	3.2471-001	3.4981-001	5.0056-001	5.0453-001
5	-1.9487-002	4.5485-001	3.6024-001	2.1436-001	2.1422-001
6	1.2422-002	6.2172-001	6.6506-001	4.1868-002	2.1480-002
7	1.6223-003	-2.3649-001	-1.6667-001	2.9139-003	1.5281-003
8	-4.4011-002	6.0952-001	6.5686-001	1.8874-002	1.0431-003
9	-7.3642-003	7.6741-001	8.2100-001	1.2303-001	1.0521-001
10	1.7283-002	7.7907-001	8.9087-001	3.4986-001	3.2686-001
11	3.9833-004	3.2555-001	3.5568-001	9.6782-001	1.0000+000
12	-2.6183-002	8.4333-003	3.4318-002	6.6394-001	6.4842-001

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	-8.8300-005	3.1100-003	2.4430-003	2.9152-007	-1.0658-004	-1.6421-001	-7.8977-005	9.8144-003	3.9738-003
2	0.0000	1.0000+000	1.8414-002	1.8963-001	-3.9923-004	-4.5586-002	5.7071-003	-1.8830-001	4.4813-002	-6.4500-001
3	0.0000	4.4606-003	3.8158-002	-1.2208-001	1.9934-004	8.7705-003	7.3753-002	3.2514-001	-2.2225-001	3.6745-001
4	0.0000	2.1411-003	-2.1190-002	-3.2264-002	4.4356-004	-4.5345-003	2.1460-002	1.8349-001	-2.3803-001	-1.1475-001
5	0.0000	-5.7895-003	-4.9299-002	1.6940-002	-2.4304-004	-4.4354-005	1.5063-001	-1.4610-001	-5.0372-001	-1.3405+000
6	0.0000	2.9715-003	2.2181-001	8.9300-001	-1.7590-003	1.0000+000	1.9481-001	-6.1857-001	-7.3143-001	-8.3007-001
7	0.0000	3.9151-004	3.3496-002	1.0995-001	-2.1128-004	1.1634-001	1.0000+000	-7.4095-002	-6.6160-002	-8.8883-002
8	0.0000	-2.3055-002	-5.8951-001	2.9015-001	2.1060-005	2.3540-001	1.9523-001	-3.2822-001	-5.9306-001	-3.8360-001
9	0.0000	-2.0930-002	-3.0044-001	1.3000+000	1.2495-001	7.9582-002	2.0780-001	-6.0424-001	-8.2283-001	-6.7621-001
10	0.0000	2.0270-003	2.2580-001	4.0317-001	-6.5002-005	-3.2104-002	1.6366-001	-1.7662+000	-3.0549-001	1.8146+000
11	0.0000	3.0604-004	-1.7230-003	9.8266-003	-2.3936-004	5.7776-003	1.4500-002	-2.8397-001	-6.5232-001	1.5115+000
12	0.0000	-5.4725-003	1.1811+000	-4.5265-001	1.0000+000	-3.0552-001	-7.7195-002	-2.0469+000	2.2354-001	2.6009+000

T22

	11	12
1	4.4656-004	7.1483-004
2	-4.0546-002	6.7682-002
3	-5.6607-002	-2.4039-002
4	3.3991-001	1.3577-001
5	6.2562-002	-5.8505-002
6	-1.3520-002	-9.3606-002
7	-9.9545-004	-9.2460-003
8	-2.1002-002	-6.1494-002
9	-5.0941-002	-7.7662-002
10	6.0154-001	-4.1226-001
11	-2.3232+000	1.0000+000
12	-7.1937-004	-1.5075-001

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-4.0081+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-4.3178+001	3.2363+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	-3.2363+001	-4.3178+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-5.0012+001	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-3.9164+001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.5142-001	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.6054+001	7.2603+000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-7.2603+000	-1.6054+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.2613+001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.5085-001
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	4.5085-001	0.0000
11	-2.2613+001	0.0000
12	0.0000	-1.7340+001

T12

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-5.7486-003	1.0256-002	-9.7617-003	3.1902-005	3.8613-003	2.7687-001	4.8755-002	2.6245-002	8.9459-002
2	0.0000	1.0251-003	2.7725-003	-4.2611-002	1.2707-005	-3.1806-002	1.2737-001	1.7852-002	3.9213-002	7.0083-002
3	0.0000	-3.9758-003	4.4404-002	-2.9459-001	-7.6315-005	2.2775-002	-2.2269-001	2.3884-001	-9.0347-002	-2.3781-002
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	1.7354-001	5.3459-001	7.8703-001	-1.0337-004	-1.2487-002	-1.3844-001	-1.3547-002	2.5266-001	-9.7630-001

T12

	11	12
1	-2.9975-003	9.0383-004
2	-4.6905-003	9.0043-003
3	-1.0149-001	9.1601-002
4	0.0000	0.0000
5	6.0851-002	2.8024-002

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H1

	1	2	3	4	5
1	1.3405-001	-9.2463-001	-2.0346-001	1.5079-001	2.3644-001
2	6.4260-001	4.4014-004	-2.9423-003	5.9463-003	-9.7154-004
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	1.2008+001	6.4652-001	-3.5410+000	-3.3911+000	-6.9507-001
5	4.7272-001	8.9144+000	3.6464+000	4.0826+000	-5.0835+000
6	2.5065-001	-3.2272-001	-5.5997-001	-5.8694-001	-6.5456-002
7	1.1711-001	6.9282-002	-1.4475-001	-1.4702-001	-3.2035-002

H2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	9.2624-001	8.1696-001	3.1664-002	-1.5429-001	1.7552-001	-5.4036-003	-9.7053-001	2.2289-001	6.1507-001
2	0.0000	2.2019-003	4.6388-004	8.9610-004	1.7953-003	-1.1115-003	5.1031-004	9.0217-003	-5.7182-003	7.1364-004
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000
4	0.0000	1.9085+000	3.1522-001	1.0069+000	1.5111+000	-9.3264-001	4.3291-001	7.7560+000	-4.8258+000	6.0119-001
5	0.0000	-2.0072+000	-5.8510+000	-1.0665+000	-1.5682+000	9.8169-001	-4.5416-001	-8.1622+000	5.0781+000	-6.3085-001
6	0.0000	3.0541-001	4.4512-001	2.5506-00[illegible]	2.4144-001	-1.4680-001	6.9397-002	1.2385+000	-7.6981-001	9.5995-002
7	0.0000	7.7911-002	5.7286-002	8.2096-0[illegible]	6.1744-002	-3.7851-002	1.7960-002	3.1627-001	-1.9619-001	2.4621-002

H2

	11	12
1	1.3358-001	-2.7564-002
2	5.1183-004	7.1156-004
3	0.0000	0.0000
4	5.2290-001	6.0278-001
5	-5.5738-001	-6.3294-001
6	8.4747-002	9.6513-002
7	2.1756-002	2.4678-002

XT2

	1	2	3	4	5
1	1.3737-001	1.0108-001	-2.6081-004	6.3814-004	1.8929-001
2	1.2344+001	-4.7033+001	5.5712-001	7.5317-001	6.9787+002
3	3.9597+000	5.2135+000	-2.1460-002	2.5581-002	-5.4989+001
4	-2.6764-001	-1.3119+000	2.2430-003	-2.6097-002	-1.3901+001
5	-7.5098+000	6.3665-002	-5.2121-002	-2.9677-002	1.9020+001
6	-4.5184+000	-2.8463+000	2.6274-004	-5.5372-002	2.1590+001
7	2.8607-001	2.1586-001	-6.1187-004	2.7744-004	1.9785-001
8	-1.8115+000	-3.7034-001	1.1945-002	-3.9162-002	-9.5929+000
9	2.0202+000	-6.2252+000	-3.2251-002	-8.0035-003	-4.3601+000
10	-1.2861+000	7.6554-001	9.4151-003	-3.5676-002	4.6377+000
11	1.5866+000	5.6551+000	1.4385-002	-3.0622-002	1.8452+000
12	1.6190+001	1.4567+001	2.9870-003	-1.1469-002	1.3783-001

F100 LINEAR MODEL .9/30K AS 3/9/76

T11 INVERSE

	1	2	3	4	5
1	9.6938-001	-1.9685+000	-4.7302-001	-5.8545-001	1.6104+001
2	1.5063-002	6.5302+000	-2.7719-001	4.2948-001	1.5817-002
3	9.8314-001	-6.5607+000	2.1206-001	-4.4646-001	-3.7596-004
4	1.9590-001	1.5460-001	9.7310-001	2.4609+001	2.7243-002
5	0.0000	0.0000	0.0000	-2.4087+001	0.0000

FD

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	-7.1253-002	-2.0284+000	-1.6256+000	-8.6066-001	3.6201+000
SNCOM	3.7243-001	-2.7425+000	-5.3277-001	5.4779-001	7.1210-001
PT7M	1.5728+000	-7.9014+000	-1.1008+001	4.5111+000	4.8722+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	-1.2784+002	2.5710+002	5.0941+001	7.6663+001	-2.1385+002

F100 LINEAR MODEL .9/30M A3 3/9/76

UNNORMALIZED EIGENSYSTEM.

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.13972+002)+J(0.00000)	0.00000	1.00000	1	(-8.64524-001)+J(0.00000)	-.8645245	.00000
			2	(-2.18183-001)+J(0.00000)	-.2181829	.00000
			3	(-2.64989-003)+J(0.00000)	-.0026499	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-2.15845+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.06723-002)+J(0.00000)	-.0106723	.00000
			3	(-3.96880-004)+J(0.00000)	-.0003969	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-1.31925-002)+J(0.00000)	-.0131925	.00000
(-9.74225+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(8.55666-001)+J(0.00000)	.8556659	.00000
			3	(3.54330-002)+J(0.00000)	.0354330	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(9.86520-002)+J(0.00000)	.0986520	.00000
(-1.78911+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(1.81944-001)+J(0.00000)	.1819437	.00000
			3	(-4.60368-004)+J(0.00000)	-.0004604	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-9.69082-003)+J(0.00000)	-.0096908	.00000
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(9.18468-001)+J(0.00000)	.9184684	.00000
			3	(3.57304-002)+J(0.00000)	.0357304	.00000
			4	(-3.55797-001)+J(0.00000)	-.3557970	.00000
			5	(9.56971-002)+J(0.00000)	.0956971	.00000

F100 LINEAR MODEL .9/30K A3 3/9/76

LAMBDA2 INVERSE

	1	2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-2.4950-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.4829-002	-1.1115-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	1.1115-002	-1.4829-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.9995-002	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5534-002	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.8135+000	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.1712-002	-2.3386-002	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3386-002	-5.1712-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.4206-002
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.8137-004
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2 INVERSE

	11	12
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	-8.8137-004	0.0000
11	-4.4206-002	0.0000
12	0.0000	-5.7571-002

GP

	WFMRH	ANMTX	CTVV	RCVV	BLC
SMEAN	-7.0997-003	1.9770-001	-1.2823-003	3.6594-003	4.7762+000
SMCOM	-2.0099-001	8.5753-002	5.5319-004	-9.4849-003	-1.0910-002
PT7M	-1.1133+000	-6.8240+000	7.2091-003	-4.0803-002	-5.1781+000
MECOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	4.2038+000	-1.7658+001	-2.5374-001	3.2569-001	-3.3032+002

FTCO LINEAR MODEL .9/30K 83 3/9/76

H*	N_1	N_2	P_{T7}	WF	P_B
SMEAN	-9.9212-002	-1.0958-001	8.7552-003	-1.6104-002	-1.9067-003
SMCOM	8.9262-001	-9.1365-001	8.5235-002	-4.7459-001	1.6261+000
PT7M	5.0610-001	-1.0831-001	4.1286-002	1.8417-001	1.9475-002
KECOM	4.5042-001	-1.0440-001	4.6954-001	-1.5722-001	2.4537-002
PT3	3.9002-001	6.3809-001	1.6442-001	2.9651-002	-1.8485-002
FTIT	6.8346-001	-3.2129-001	3.5645-003	4.6562-001	3.0724-002
PT45	-1.6528-001	-4.5359-001	3.2270-002	6.4928-003	-9.8580-004
TT25H	6.1603-001	-2.3974-001	9.5285-003	4.3522-001	-6.0964-002
TT25C	8.3569-001	-3.4150-001	8.4580-002	3.9955-001	3.3215-003
TT3	9.7230-001	-7.3460-001	3.0515-001	4.7024-001	4.9354-002
TT4FHI	5.4458-001	-5.9796-002	9.2075-001	-8.9607-001	3.2023-002
TT4PLO	1.3855-001	-1.5887-002	6.6341-001	3.3624-001	-2.3954-002

HD	FTIT	PT45	TT25H	TT25C	TT3
FNMX	1.7078+000	-2.3529+000	1.1445-001	-2.3991-001	1.8660+000
KFAN	6.4691-001	-1.2373-003	-1.2316-003	6.1946-003	2.0377-003
TT4	6.1603-001	-2.3974-001	9.5285-003	4.3522-001	-6.0964-002
SMAF	1.5907+001	-8.7237-001	-1.8867+000	-3.3241+000	1.9255+000
SMHC	-6.4237+000	1.1332+001	1.6755+000	2.9473+000	-7.9464+000
DP25QT	1.1170+000	-5.3492-001	-2.3462-001	-5.1841-001	3.6405-001
DP25SC	3.1799-001	-5.0947-003	-5.5697-002	-1.4226-001	7.6849-002

D*	FNMX	KFAN	TT4	SMAF	SMHC
SMFAN	4.8975-001	3.5295-001	-9.3784-004	2.4632-003	7.0749-001
SMCOM	1.3358-002	1.6046-001	1.8555-003	1.1323-003	1.9684+000
PT7M	-1.0842-001	-2.7174-003	5.3004-004	-1.1688-003	-1.7566-001
KECOM	8.9910-002	2.2323-001	6.3746-004	-6.3423-004	7.2266-002
PT3	-6.7788-002	8.2615-002	5.1686-004	2.3566-003	-6.5974-002
FTIT	-2.3850-001	1.1913-001	1.2861-003	5.5431-004	9.3355-001
PT45	5.5445-001	4.3719-001	-1.1466-003	5.4738-004	4.9057-001
TT25H	-1.4802-001	1.1141-001	1.1528-003	7.4115-004	9.2220-001
TT25C	-2.1930-001	1.4910-001	1.6037-003	1.2247-003	1.1495+000
TT3	-3.9102-001	2.6659-001	1.9255-003	4.0709-004	1.5724+000
TT4FHI	5.8081-001	5.5640-001	6.3272-004	5.7208-004	6.7627-001
TT4PLO	-2.1076-001	3.4108-001	-6.2245-004	1.0893-003	8.7771-001

F100 LINEAR MODEL .9/30K AS 3/9/76

DP

	WFMBH	ANMTX	CTVV	RCVV	PLC
FNMX	-1.7028-001	3.7625-001	4.2054-003	-3.2776-003	2.2500+000
WFAN	2.7289-004	7.7644-003	2.9127-003	1.6187-005	1.0647-002
TT4	-1.4802-001	1.1141-001	1.1528-003	7.4115-004	9.2220-001
SMAF	2.9770-001	1.1157+000	3.4244-002	1.9905-002	9.4596+000
SMHC	2.8428-001	-1.1224+000	-1.3405-002	-4.3145-002	-9.5596+000
DP25GT	1.3206-002	2.2518-001	3.3089-003	1.5641-003	1.4967+000
DP25SC	1.0987-002	6.4858-002	1.0670-003	8.5937-004	3.6910-001

```
@ELT,IL   KEN*F100ALT.SPR83-09-30
PROCESSED BY UNIVAC 1100 SERIES ELT PROCESSOR LEVEL 8 AT 4:50:39 PM ON TUESDAY, MARCH 9, 1976  (CREATING CYCLE 0)

 1.    F                           REDUCED MATRICES      .9/30K    83       FIFTH ORDER
 2.      -.7125-01 -.1595+01 -.7428+03 -.1592+01  .1826+03
 3.       .4736+00 -.2743+01 -.3096+03  .1288+01  .4568+02
 4.       .3442-02 -.1360-01 -.1101+02  .1826-01  .5376+00
 5.       .0000     .0000     .0000    -.1000+02  .0000
 6.      -.2534+01  .4008+01  .5430+03  .2811+01 -.2138+03
 7.    G                           REDUCED MATRICES      .9/30K    83       FIFTH ORDER
 8.      -.1480-01  .7049+03 -.1286+02  .9175+01  .4790+05
 9.      -.4727+00  .3888+03  .7055+01 -.3024+02 -.1391+03
10.      -.4507-02 -.5326+02  .1582+00 -.2239+00 -.1136+03
11.       .1000+02  .0000     .0000     .0000     .0000
12.       .1564+00 -.1262+04 -.5045+02  .1619+02 -.6567+05
13.    HY                          REDUCED MATRICES      .9/30K    83       FIFTH ORDER
14.       .9874+00 -.1070+01  .3624+02 -.2560+00  .5442+02
15.       .7841-02 -.1179-04 -.6821-02  .1389-03  .1240-02
16.       .1795+00 -.5501-01  .1270+01  .2349+00 -.8974+00
17.       .2649-03 -.1137-04 -.1431-01 -.1021-03  .1012-02
18.      -.1106-03  .1537-03  .1320-01  .9560-04 -.6912-02
19.       .1114-03 -.4979-04 -.1069-01 -.9561-04  .1631-02
20.       .3171-04 -.3097-06 -.2538-02 -.2624-04  .3665-03
21.    DY                          REDUCED MATRICES      .9/30K    83       FIFTH ORDER
22.      -.1821+00  .7756+03  .2436+02 -.4751+01  .1305+05
23.       .6115-05  .3364+00  .3541+00  .4919-03  .1294+01
24.      -.7989-01  .1159+03  .3374+01  .5422+00  .2699+04
25.       .9140-05  .6603-01  .5701-02  .8284-03  .1575+01
26.       .9067-05 -.6600-01 -.2318-02 -.1865-02 -.1653+01
27.       .2436-05  .8605-01  .3309-02  .3910-03  .1497+01
28.       .2026-05  .2306-01  .1067-02  .2146-03  .3891+00

END ELT.  TIME: 2.2612 SECONDS.

@FTN
```

CASE 3

```
THE REDUCED MATRICES FR,GR,HR,DR WILL BE SAVED FOR OPTSYS ON FILE 12
INTERMEDIATE DATA WILL BE READ FROM RECORD NO.  1 OF FILE 10

THERE WILL BE 12 EIGENVALUES ELIMINATED. THE TOLERANCE LEVEL FOR ELIMINATION IS       .100
  1 OF THESE EIGENVALUES ARE COMPLEX, TO BE ELIMINATED ARE--
( -.250000+000,  .000000     )
( -.577300+003,  .000000     )
( -.589000+002,  .000000     )
( -.500900+002,  .000000     )
( -.388500+002,  .000000     )
( -.476700+002,  .000000     )
( -.179100+002,  .439000+001)
( -.184100+002,  .000000     )
( -.648000+000,  .000000     )
( -.206900+002,  .000000     )
( -.220000+002,  .000000     )
( -.190000+001,  .000000     )

THE IDENTIFYING TITLE FOR FR,GR,HP,DR ON OPTSYS OUPUT =REDUCED MATRICES   0/0K  87   FIFTH ORDER
```

F100 LINEAR MODEL 0/0K 83 2/17/76

LAMBDA1

	1	2	3	4	5
1	-1.7463+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-6.7190+000	1.2930+000	0.0000	0.0000
3	0.0000	-1.2930+000	-6.7190+000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-2.6289+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

TI1

	1	2	3	4	5
1	-2.4811-002	1.2774+000	-2.4362-002	1.0000+000	3.1625-001
2	-8.1046-003	-2.0373-001	-1.2380-001	6.7854-001	2.0876-002
3	-2.6155-002	9.5055-001	-1.7305+000	3.8667-001	4.9698-001
4	0.0000	0.0000	0.0000	0.0000	-6.5207-001
5	8.2593-001	-2.7685-001	-1.0249+000	7.8628-001	3.5569-002

XI1

	1	2	3	4	5
1	4.5707-001	.8603+001	-1.0907-001	6.7656-001	-2.1011+002
2	2.6521+000	-6.4747-001	1.6069-002	2.1306-002	-1.3537+000
3	-2.4822+000	3.5197+000	2.1025-002	1.5860-002	2.6908+000
4	8.7904-001	6.5192-001	2.3222-003	-1.0916-002	-1.2607+000
5	-1.5335+001	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL 0/0K 83 2/17/76

T21

	1	2	3	4	5
1	-1.8760-006	-3.2855-002	-1.1879-002	-2.0822-002	-4.5333-004
2	1.0000+000	-1.8305-001	-8.7512-001	6.5374-001	-5.4493-002
3	2.5914-003	1.1736+000	-3.9383-001	6.7691-001	4.3401-001
4	2.5145-003	1.1182+000	-6.8294-001	5.9279-001	5.0684-001
5	-2.3560-002	8.3687-001	-5.7185-001	9.8503-001	5.6705-001
6	1.0740-002	9.0225-001	1.2802-001	2.7211-001	1.5371-002
7	1.3968-003	4.0387-002	-1.2235-002	-4.3796-002	1.1007-003
8	-2.7626-002	7.7389-001	1.9007-001	1.9762-001	-3.1375-002
9	1.3932-003	9.9340-001	1.5694-001	2.6463-001	1.9134-002
10	5.4222-004	1.7251-001	-3.8275-002	-4.0095-001	4.5396-003
11	2.5240-002	1.6032+000	-1.3354-001	2.0715-001	2.1830-001
12	1.5131-004	1.5184+000	-1.1945+000	6.8234-001	1.0000+000
13	-6.6162-002	1.0576+000	-7.0006-001	2.4368-001	3.1946-001

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	7.8763-006	-3.9958-003	6.7062-005	-5.6223-004	-3.2207-003	1.4860-002	5.6598-003	9.3674-005	4.1398-003
2	0.0000	1.0000+000	-1.4410-001	7.7912-003	-5.8455-002	1.5999-002	8.4128-002	1.9283-001	1.7596-002	7.7864-002
3	0.0000	2.8444-004	8.1583-003	5.2686-004	-2.9011-003	1.2527-002	-1.1748-001	-3.8088-001	-4.8795-003	6.2382-002
4	0.0000	2.1472-004	2.2949-003	-4.7526-003	-1.2058-002	-8.8583-005	-1.0584-001	-1.1327-001	8.0286-002	4.8733-002
5	0.0000	-2.1697-004	6.1873-003	-2.2592-003	2.6973-002	-1.1622-002	-7.5071-001	-1.4637-001	6.8239-003	1.3467-001
6	0.0000	6.8223-005	3.3431-001	-5.7528-003	1.0000+000	-1.5405-001	-1.2951+000	-5.2101-002	-4.5536-003	3.1613-002
7	0.0000	9.0555-006	4.1262-002	-7.0101-004	1.1821-001	-1.8649-002	-1.3234-001	5.0573-003	-4.5760-004	1.0000+000
8	0.0000	-6.1216-004	-6.5494-002	3.2068-004	2.3985-001	-6.6506-003	-8.3488-001	-1.4582-001	-3.5487-003	2.2608-002
9	0.0000	-1.9342-002	1.0000+000	-1.4243-002	9.2654-002	6.5153-001	-1.2314+000	-1.5147-001	-7.2940-003	-6.4378-003
10	0.0000	-7.6987-003	3.7893-001	-5.3447-003	3.4072-002	2.4349-001	-4.0924-001	-2.6318-002	-2.3997-003	-7.9863-003
11	0.0000	-2.3270-003	1.8643-001	-1.9003-003	-2.5557-002	5.3538-002	-2.4071+000	2.4134+000	-9.2831-002	-3.7189-002
12	0.0000	5.1915-006	-9.8626-004	3.1480-003	1.2851-002	4.9463-005	-5.9569-001	2.1081-001	1.0000+000	5.1150-002
13	0.0000	-1.5255-002	-7.5660-001	1.0000+000	-2.2743-001	1.0000+000	-2.3893+000	3.5538+000	2.3723-001	-2.3392-002

T22

	11	12	13
1	8.5513-004	6.2465-004	-2.5250-002
2	-7.5926-002	-9.0720-003	1.9155-002
3	5.2400-003	6.6660-005	9.6035-002
4	1.5452-002	-1.0068-001	7.9517-002
5	-1.1774-001	-4.7778-002	1.1557-001
6	-7.5820-002	-5.8632-002	7.0782-002
7	-7.9252-003	-6.2300-003	-2.3564-002
8	-3.8404-002	-3.1497-002	6.4124-002
9	-7.4964-002	-5.9167-002	7.4835-002
10	-2.5160-002	-1.9801-002	1.0000+000
11	8.8081-001	3.0865-001	4.7360-002
12	-3.6385-001	1.0000+000	8.5465-002
13	1.0000+000	8.1743-001	-4.0295-003

F100 LINEAR MODEL 0/0X 83 2/17/76

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-5.7740+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-5.8940+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-5.0046+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-3.8857+001	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-4.7671+001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.7917+001	4.3901+000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.3901+000	-1.7917+001	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.8416+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-6.4825-001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-2.0690+001	0.0000	0.0000
12	0.0000	-2.2001+001	0.0000
13	0.0000	0.0000	-1.9075+000

T12

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-6.8680-003	-2.5923-002	8.0503-004	4.7635-003	-2.7262-002	8.4327-002	-4.8242-002	-1.8133-003	1.2405-001
2	0.0000	3.1188-003	-1.5714-002	8.4031-005	-6.4375-002	8.2965-003	1.5953-001	3.1802-002	-2.7468-004	1.3804-001
3	0.0000	-6.5833-003	6.0730-003	9.7613-003	1.9256-002	1.8800-002	5.9000-002	-2.0758-001	1.2508-002	-4.4968-002
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	2.7668-003	-6.4444-002	1.4132-002	1.1055-002	1.2685-002	3.6424-002	2.6632-001	2.7792-002	1.2563-001

F100 LINEAR MODEL 0/0K 83 2/17/76

T12

	11	12	13
1	1.9452-002	6.2847-003	1.6676-001
2	1.0070-002	6.0607-003	6.5797-002
3	-7.1111-002	-2.5432-002	-2.6682-002
4	0.0000	0.0000	0.0000
5	-7.5111-002	2.4466-003	2.9236-002

H1

	1	2	3	4	5
1	3.3261-001	-5.9229-001	6.5338-002	-3.5518-002	1.3652-001
2	6.1767-001	1.7228-004	-1.9746-003	5.9175-003	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	3.9581+000	3.6697-001	-3.3209+000	1.1445-001	7.4384-004
5	8.3320-001	8.2255+000	3.5799+000	3.8052-001	-5.1375+000
6	1.6631-001	-3.7048-001	-6.6009-001	-4.8873-002	4.7498-002
7	9.5342-002	5.7653-002	-1.7076-001	-1.1453-002	-3.4621-003

H2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	6.4380-001	5.3926-001	4.0283-002	-4.6488-002	8.8500-002	1.4036-002	-3.7962-001	4.4344-003	5.0607-003
2	0.0000	0.0000	-1.8555-004	1.7233-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000
4	0.0000	6.8874-002	-2.7053-001	3.4662-001	2.9619-002	3.7364-002	3.4020-002	9.2951-003	3.2228-002	3.2226-002
5	0.0000	-7.3789-002	-4.2850+000	-3.7470-001	-3.2527-002	-3.9417-002	-3.6815-002	-9.4970-003	-3.5319-002	-3.5008-002
6	0.0000	1.4112-002	3.4185-001	1.7019-001	6.4978-003	7.8205-003	7.5249-003	2.0507-003	6.8561-003	6.8568-003
7	0.0000	3.6480-003	3.5063-002	6.1063-002	1.8368-003	2.1701-003	2.1462-003	5.1268-004	1.8480-003	1.8481-003

H2

	11	12	13
1	4.1534-001	1.1017-001	5.1659-003
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	3.0578-002	-2.9685-002	3.2475-002
5	-3.3772-002	3.3771-002	-3.5132-002
6	6.3679-003	-5.5563-003	6.7009-003
7	1.8609-003	-1.2279-003	1.8486-003

F100 LINEAR MODEL 0/0K 83 2/17/76

XI2

	1	2	3	4	5
1	1.1595-001	7.4429-002	3.8596-004	2.6976-004	1.4173-001
2	-4.0742-001	-7.6418+000	1.3192-001	-5.1217-001	2.0322+002
3	2.3359+001	1.6899+001	-4.7664-002	4.0885-001	-1.1775+002
4	6.4475+001	4.8336+001	-3.5662-002	1.1404+000	-2.6929+002
5	-2.2326+001	-1.3347+001	2.7592-002	-3.2036-001	6.1024+001
6	-4.4073+001	-2.8856+001	7.8159-002	-6.8970-001	1.6404+002
7	-4.1669+000	-2.5296+000	2.0952-002	-2.7612-002	-3.9299+000
8	-4.0522+000	-4.5399+000	8.3421-002	3.6403-002	-6.4645+000
9	1.1996+001	1.4387+001	-1.0374-001	-7.2996-002	1.9101+001
10	2.7561-001	1.8125-001	9.1207-004	3.8680-004	2.7690-001
11	-3.3321-001	8.4357+000	-2.0789-001	-2.7200-001	3.3794+001
12	-5.8124+000	-7.1262+000	2.3293-002	-5.3876-002	-1.7667+000
13	9.3625-001	7.1107-001	3.8125-003	-1.1164-003	3.1617-001

T11 INVERSE

	1	2	3	4	5
1	4.2920-001	-1.6772+000	-5.9005-001	-2.3040-001	1.1887+000
2	5.9932-001	-9.2485-001	5.1469-002	3.0085-001	1.0559-002
3	3.7953-001	-2.2922-001	-5.6169-001	-2.5182-001	-8.6363-003
4	2.5431-001	1.1342+000	-9.4071-002	8.8814-002	1.5792-002
5	0.0000	0.0000	0.0000	-1.5335+000	0.0000

FR

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	-3.2451+000	-2.7556+000	-3.7690+000	5.8819-001	5.0024+000
SNCOM	1.2358+000	-5.9412+000	-9.0781-001	1.5249-001	1.6653+000
PT7M	4.0246+000	-7.0229+000	-1.0034+001	1.9929+000	5.2580+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	-5.8035+001	2.3507+002	8.1783+001	3.2902+001	-1.7147+002

F100 LINEAR MODEL 0/0K 83 2/17/76

UNNORMALIZED EIGENSYSTEM.

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.74625+002)+J(0.00000)	0.00000	1.00000	1	(-8.06017-001)+J(0.00000)	-.8060170	.00000
			2	(-3.35196-001)+J(0.00000)	-.3361961	.00000
			3	(-3.49790-003)+J(0.00000)	-.0034979	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	000000	.00000
(-2.62888+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(8.66428-001)+J(0.00000)	.8664264	.00000
			3	(1.59180-003)+J(0.00000)	.0015918	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.93823-002)+J(0.00000)	.0293823	.00000
(-6.71900+000)+J(1.29305+000)	6.84229+000	.98198	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-2.01210-001)+J(-1.27583-001)	.2382496	-147.62203
			3	(3.16851-003)+J(-5.51653-003)	.0063617	-60.12838
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-7.50528-003)+J(-3.00492-002)	.0309723	-104.02364
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(-4.72543-001)+J(0.00000)	-.4725429	.00000
			2	(-3.98308-002)+J(0.00000)	-.0398308	.00000
			3	(-3.05702-003)+J(0.00000)	-.0030570	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-1.98104-003)+J(0.00000)	-.0019810	.00000

LAMBDA2 INVERSE

	1	2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.7319-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.6964-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-1.9982-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-2.5735-002	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-2.0977-002	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.2653-002	-1.2902-002	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2902-002	-5.2653-002	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.4300-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.5426+000
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL 0/0K 83 2/17/76

LAMBDA2 INVERSE

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-4.8332-002	0.0000	0.0000
12	0.0000	-4.5452-002	0.0000
13	0.0000	0.0000	-5.2426-001

GP

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	1.4697-002	-9.8082-002	1.6735-002	-6.0250-003	2.1582+000
SNCOM	2.3074-001	1.5752-001	-3.3260-003	-1.9759-002	6.1843-001
PT7M	-6.1547-001	-6.9100+000	-2.5987-002	-3.0356-002	-1.7520+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	-3.6097+000	2.4407+000	1.1329-001	6.5282-001	-1.6812+002

H*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	-2.9495-002	9.4955-003	6.9413-003	-8.0466-003	-5.7539-004
SNCOM	1.5337-001	-5.6545-001	-1.6945-001	7.6415-002	1.2046+000
PT7M	7.2715-001	-2.3169-001	2.1641-001	-1.5380-001	2.9564-002
WFCOM	5.6280-001	-2.0749-001	3.8391-001	-2.1679-001	3.0056-002
PT3	5.2491-001	5.1386-001	2.8551-001	-3.8398-001	1.3266-003
FTIT	6.6314-001	-5.7318-001	-5.7403-002	2.3733-001	2.5485-002
PT45	9.0233-003	-8.6564-002	1.2247-002	9.3322-003	1.5008-003
TT25H	5.7035-001	-4.8882-001	-6.9216-002	2.5700-001	-2.3186-002
TT25C	7.2282-001	-6.5691-001	-6.2736-002	2.5319-001	1.4969-002
TT3	-1.2370-002	-6.0645-001	6.7776-002	1.8843-002	-3.5352-003
TT4PHI	9.7366-001	-1.2595+000	1.2314-001	1.9377-001	5.1355-002
TT4PLC	6.3022-001	-3.5677-001	6.8482-001	-7.1536-001	3.7304-002
TT4	3.2579-001	-3.8441-001	5.7610-001	9.1799-002	-5.5856-002

F100 LINEAR MODEL 0/0K 83 2/17/75

HR

	FTIT	PT45	TT25H	TT25C	TT3
FNMX	1.1412+000	-1.5504+000	2.2615-001	-1.3321-001	9.6540-001
WFAN	6.1763-001	1.7917-004	-1.9486-003	5.9087-003	-3.0618-007
TT4	5.7435-001	-4.8682-001	-6.9218-002	2.5700-001	-2.3186-002
SMAF	4.0576+000	2.2316-001	-3.2495+000	1.2531-001	8.5979-002
SMHC	-2.6019+000	9.4406+000	2.5131+000	1.0720+000	-5.3641+000
DP25QT	5.3242-001	-5.1339-001	-5.2093-001	-1.2962-001	7.9715-002
DP25SC	1.6143-001	2.8986-002	-1.3949-001	-2.7932-002	3.8010-003

D*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	4.5301-001	2.9943-001	1.5485-003	1.0960-003	5.5780-001
SNCOM	-1.8986-002	-2.1786-002	-9.2758-005	-1.2888-003	3.9860-001
PT7M	8.7379-002	8.6259-002	-1.6308-003	-7.6318-004	1.7714-001
WFCOM	1.3263-001	1.4372-001	-1.1980-003	-3.8322-004	2.0191-001
PT3	2.6412-001	1.5251-001	-1.1842-003	2.0111-003	1.4793-001
FTIT	7.1724-002	7.4101-002	-1.7954-003	-1.2995-003	6.4852-001
PT45	4.1988-001	2.7816-001	1.2450-003	4.4657-004	4.8932-001
TT25H	1.0323-001	7.4194-002	-1.4703-003	-1.0062-003	6.8114-001
TT25C	8.2311-002	7.5015-002	-1.9040-003	-1.3100-003	6.9345-001
TT3	5.4825-001	4.1956-001	1.7961-003	-1.0961-003	4.0639-001
TT4PHI	7.1466-002	1.3891-001	-2.8309-003	-3.1447-003	1.0275+000
TT4PLO	5.2097-001	3.8098-001	-9.7771-004	-6.1675-004	5.1258-001
TT4	1.1015-001	2.5138-001	6.5599-004	-6.5599-004	6.8391-001

DP

	WFMRH	ANMIX	CTVV	RCVV	BLC
FNMX	9.1807-002	3.7772-002	-5.5716-003	-4.0158-003	7.2304-001
WFAN	6.6421-006	4.1862-003	-5.1349-003	4.8834-006	1.3911-006
TT4	1.0323-001	7.4194-002	-1.4703-003	-1.0062-003	6.8114-001
SMAF	5.7414-002	-1.1394-001	5.2503-002	2.4048-003	3.4332-001
SMHC	-4.6138-001	-1.1675-001	6.1883-003	-2.0081-002	-1.4653+000
DP25QT	6.0448-002	2.4670-002	-3.1648-003	-1.1608-003	1.8841-001
DP25SC	1.3551-002	6.7686-003	-1.1955-003	1.8670-004	4.0653-002

```
PROCESSED BY UNIVAC 1100 SERIES FIT PROCESSOR LEVEL W6 AT 3:37:10 PM ON TUESDAY, FEBRUARY 17, 1976  (CREATING CYCLE 0)

F                                REDUCED MATRICES    0/0K  83   FIFTH ORDER
    -.3245+01 -.2158+01 -.9155+03  .5731+00  .1342+03
     .1602+01 -.5941+01 -.2816+03  .1897+00  .5705+02
     .1685-01 -.2554-01 -.1003+02  .7994-02  .5807+00
     .0000     .0000     .0000    -.1000+02  .0000
    -.2143+01  .6862+01  .7405+03  .1195+01 -.1715+03
G                                REDUCED MATRICES    0/0K  83   FIFTH ORDER
     .1432-01 -.3553+03 -.9906+02 -.1549+02  .2220+05
     .2871+0   .7286+03  .2514+02 -.6487+02  .8122+04
    -.2469-02 -.1030+03  .6333+00 -.3213+00 -.7418+02
     .1000+02  .0000     .0000     .0000     .0000
    -.1311+00  .3295+03 -.2500+02  .6257+02 -.6445+05
HY                               REDUCED MATRICES    0/0K  83   FIFTH ORDER
     .1662+01 -.1768+01  .7999+02 -.1890+00  .3771+02
     .1383-01  .3142-05 -.1060-01  .1289-03 -.1839-06
     .1694+00 -.1129+00 -.4959+01  .7386-01 -.1835+00
     .7590-04  .3269-05 -.1477-01  .2284-05  .4315-04
    -.4859-04  .1381-03  .1140-01  .1951-04 -.2688-02
     .5177-04 -.3909-04 -.1230-01 -.1228-04  .2079-03
     .1570-04  .2207-05 -.3295-02 -.2646-05  .9915-05
DY                               REDUCED MATRICES    0/0K  83   FIFTH ORDER
     .1302+00  .1992+03  .4802+02 -.1503+02  .1083+05
     .1449-06  .3395+00  .6806+00  .2812-03  .3204-03
     .2947-01  .7927+02  .2567+01 -.7631+00  .2066+04
     .1046-05 -.7720-02 -.5814-02  .1157-03  .6605-01
    -.8395-05 -.7897-02 -.6841-03 -.9643-03 -.2815+00
     .5727-05  .8688-02  .1833-02 -.2902-03  .1884+00
     .1284-05  .2384-02  .6881-03  .4668-04  .4065-01
```

CASE 4

RESTORED MATRICES

EIGENVALUES

-.2500+00	.0000
-.5718+03	.0000
-.1789+03	.0000
-.5773+02	.0000
-.5009+02	.0000
-.4978+02	.0000
-.3890+02	.0000
-.2014+01	.0000
-.5141+01	.0000
-.7325+01	.3912+01
-.7325+01	-.3912+01
-.1805+02	.3871+01
-.1805+02	-.5871+01
-.1668+02	.0000
-.2121+02	.0000
-.1955+02	.0000
-.1000+02	.0000

F100 LINEAR MODEL 1.2/0K R3 3/3/76

LAMBDA1

	1	2	3	4	5
1	-1.7895+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-5.1414+000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-7.3250+000	3.9124+000	0.0000
4	0.0000	0.0000	-3.9124+000	-7.3250+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

T11

	1	2	3	4	5
1	-3.5781-002	1.0000+000	-1.1760-001	-1.5193-001	4.1627-001
2	-8.8808-003	3.2119-001	2.9566-002	5.2937-003	1.8919-002
3	-2.6110-002	9.2372-001	-1.6224-001	4.1399-002	3.2400-001
4	0.0000	0.0000	0.0000	0.0000	-4.4372-001
5	7.8803-001	9.8765-001	-2.1447-002	-7.5020-002	1.3326-001

XI1

	1	2	3	4	5
1	-9.1337-001	4.2754+000	-1.0871+001	-5.8325-001	-2.1886+002
2	5.6568+000	-1.5813-001	5.6259-002	1.4474-002	-3.9497+000
3	-1.1703+001	3.4263+001	1.7868+000	7.6872-002	1.6669+001
4	-2.7987+000	-2.1172+001	-3.1681+000	2.1857-001	-7.4613+000
5	-2.2537+001	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL 1.2/0K 83 3/3/76

T21

	1	2	3	4	5
1	8.9687-006	3.6934-003	1.5987-003	-3.2500-004	1.6850-003
2	1.0000+000	9.1592-001	-3.0473-002	-7.9464-002	9.5582-002
3	5.6018-004	6.2123-001	-1.2744-001	-6.7571-002	4.2100-001
4	-1.6843-003	6.1594-001	-1.5205-001	-5.4739-002	5.0308-001
5	-2.5562-002	6.9959-001	-8.3409-002	-2.2258-002	4.3757-001
6	7.6731-003	-7.6539-002	-3.4185-002	3.6685-002	-8.2453-002
7	-6.8986-002	2.2167-001	-1.0260-001	1.1427-001	2.7397-001
8	-1.9699-002	-1.2960-001	-2.8131-002	3.2618-002	-1.0517-001
9	[illegible]	-7.9653-002	-4.3696-002	3.6370-002	-7.0847-002
10	-2.6807-003	-2.0927-003	-7.2352-003	1.3946-002	-1.7626-002
11	2.0967-002	-1.5206-001	-6.8150-002	1.1001-001	-5.5089-002
12	3.7581-004	8.2989-001	-2.4081-001	-1.0664-002	1.0000+000

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	8.1136-006	-4.0893-003	2.0771-004	-4.2869-004	-6.0754-003	-1.2738-002	-1.6190-003	-3.7294-003	-2.1101-003
2	0.0000	1.0000+000	5.6512-003	1.3403-002	-2.2373-002	4.2178-002	3.7668-002	-4.2426-002	-3.2512-002	-6.6692-002
3	0.0000	1.7138-004	1.5235-002	-1.7073-004	3.8782-004	3.5531-002	5.7723-002	-2.1869-002	7.2030-002	6.2099-002
4	0.0000	1.4963-004	1.7325-002	2.4851-004	-3.3947-004	2.6764-002	5.6916-002	5.1435-002	9.5673-002	1.4482-001
5	0.0000	-2.2067-004	-1.9866-002	-1.7802-003	3.3792-003	-4.4871-002	2.3446-002	6.9573-002	1.4883-001	8.1326-002
6	0.0000	2.8569-005	9.4489-001	1.8031-001	1.7807-002	9.5853-001	-1.3268-002	1.7011-001	2.3439-001	1.3418-001
7	0.0000	-1.5402-002	-8.4909-001	1.0000+000	1.0000+000	-3.7896-001	-3.3583-002	1.2266+000	-1.7766-001	1.0000+000
8	0.0000	-2.4590-004	-1.5706-001	-1.3169-004	-1.1520-004	2.3443-001	-1.5470-002	9.2623-002	1.6435-001	9.0375-002
9	0.0000	-1.9686-002	1.0000+000	-4.4059-002	9.0357-002	1.0000+000	-1.1497-002	1.8449-001	2.5737-001	1.4847-001
10	0.0000	-7.8321-003	3.7859-001	-1.6521-002	3.3880-002	3.6767-001	1.0000+000	6.5186-002	8.1739-002	4.7326-002
11	0.0000	-2.4488-003	2.1134-001	-2.3918-003	5.2409-003	-7.3663-002	-5.4733-002	9.2649-001	2.3143-002	6.0389-001
12	0.0000	-5.8007-006	-8.6640-003	-1.4170-004	1.8145-004	-2.7530-002	6.2403-002	5.0008-001	-1.4057-002	8.6571-001

T22

	11	12
1	-5.7960-004	-3.9036-004
2	-1.3647-004	-5.6987-002
3	1.4861-003	1.8750-002
4	-6.1551-002	-1.0381-003
5	2.9940-002	-4.6025-005
6	4.7424-002	2.9245-002
7	-5.2374-002	1.0000+000
8	2.7240-002	1.9326-002
9	5.1913-002	3.2214-002
10	1.7557-002	1.0685-002
11	-4.8395-001	9.1604-001
12	1.0000+000	-5.8745-002

F100 LINEAR MODEL 1.2/0K 83 3/3/76

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-5.7177+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	.5.7735+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-5.0093+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-4.9778+001	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-3.8898+001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.0141+000	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.8048+001	3.8711+000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-3.8711+000	-1.8048+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.6684+001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
11	-2.1214+001	0.0000
12	0.0000	-1.9552+001

[illegible]

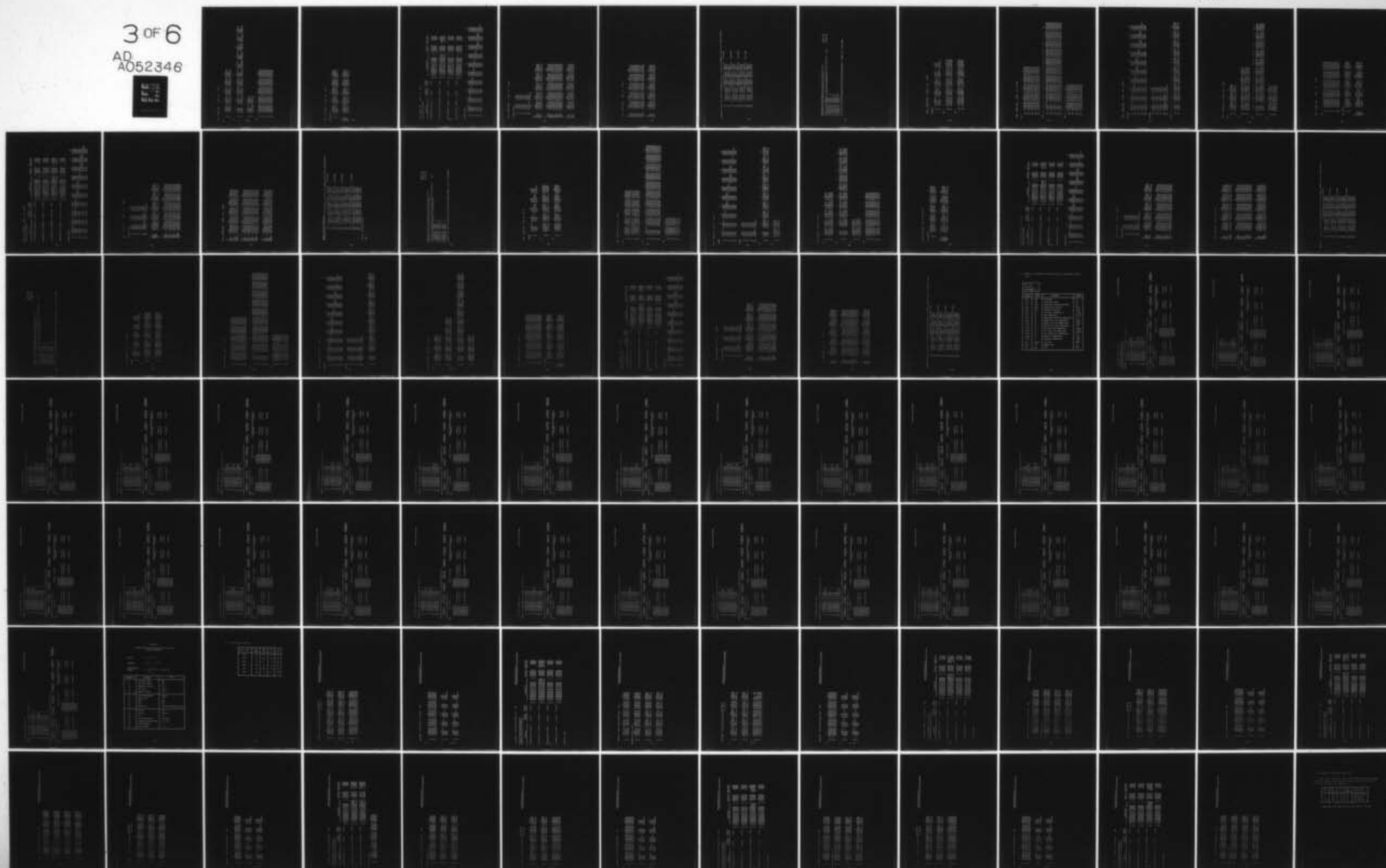
	1	2	3	4	5	6	7	8	9	10
[illegible]	[illegible]	-1.0623-002	-6.2191-002	1.0189-003	-2.5309-003	-8.8582-002	1.1431-001	-3.6026-002	-1.9436-002	3.9721-003
[illegible]	[illegible]	[illegible]	1.2466-002	3.8802-004	-4.3399-004	-1.1608-002	-6.6067-003	-1.3738-002	-3.7189-002	-2.5738-002
[illegible]	[illegible]	[illegible]	-1.3399-001	9.1675-003	1.8383-002	-8.0404-002	-3.8601-002	-1.2961-001	-5.9207-003	-9.6815-002
[illegible]	[illegible]	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
[illegible]	[illegible]	[illegible]	5.8194-003	9.6991-003	-1.9157-002	-9.9267-003	3.5618-002	-4.5222-002	-4.9674-002	-7.2211-002

[illegible]

	[illegible]	12
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

AD-A052 346 SYSTEMS CONTROL INC PALO ALTO CALIF AERONAUTICAL AND--ETC F/G 21/5
F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM. VOLUME II. APPEND--ETC(U)
JUN 77 R L DE HOFF, W E HALL, R J ADAMS F33615-75-C-2053
UNCLASSIFIED AFAPL-TR-77-35-VOL-2 NL

3 OF 6
AD
A052346



F100 LINEAR MODEL 1.2/0K 83 3/3/76

M1

	1	2	3	4	5
1	- .7563-001	-1.0749+000	5.9537-001	-1.8345-001	3.0440-001
2	.5875-001	2.0199-002	-4.3206-003	1.6462-002	-2.2183-003
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	1.6635+000	1.7743+000	-3.8884-001	3.3162-002	-1.9887-001
5	6.3234+000	2.6007+001	9.8371-001	-3.7676-001	-6.8927+000

M2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	1.3135+000	8.5655-001	-7.7121-002	-2.3402-002	-3.1412-001	3.8134-002	-2.0584-001	3.7831-002	3.6896-002
2	0.0000	0.0000	-1.4479-002	-3.1536-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000
4	0.0000	-2.8469-003	-1.2931+000	-2.8599-001	-6.5846-003	2.9006-002	-3.8253-003	-3.8625-002	-3.8252-003	-3.8254-003
5	0.0000	7.5453-003	-9.7668+000	7.2409-001	1.7874-002	-7.8579-002	9.8255-003	1.0361-001	1.0716-002	9.8227-003

M2

	11	12
1	8.6605-001	3.9655-001
2	0.0000	-2.3355-004
3	0.0000	0.0000
4	-6.7546-003	-2.3246-002
5	1.8114-002	5.9118-002

XI2

	1	2	3	4	5
1	8.8 [illegible]7-002	-1.0847-003	3.0593-003	3.7434-004	1.1944-001
2	9.7905-002	-1.9406+000	7.8249+000	4.3811-001	2.5182+002
3	1.0958+001	2.3143+000	-2.5936+000	-1.3756-001	-4.7597+001
4	3.5722+000	7.0566-001	-6.6496-001	-5.3141-002	-1.9508+001
5	7.1853+000	2.0791+000	-1.6141+000	-1.2804-001	-3.2272+001
6	-1.8512+001	-3.3260+000	2.6105+000	1.5484-001	5.2365+001
7	4.9568-001	1.6222-003	1.4585-002	1.5799-003	6.4955-001
8	-3.2483+001	-2.5011+001	3.0545+000	-1.9404-001	-3.0208+001
9	2.2845+001	1.3162+001	6.7640-001	-1.1358-003	-5.7298+000
10	3.8380+001	2.8415+001	-3.2876+000	2.2258-001	3.6257+001
11	-2.0571+000	-3.3178+000	1.8315+000	-8.1347-002	-6.6095+000
12	9.3924-001	9.5951+000	1.6431+000	4.9640-002	2.4640+001

F100 LINEAR MODEL 1.2/0K 83 3/3/76

TII INVERS

	1	2	3	4	5
1	-6.6044-001	-1.7111+000	5.6437-003	-3.2205-001	1.2199+000
2	1.1850-001	1.9005+000	2.5577-001	3.8955-001	3.5272-002
3	-5.5104-001	1.2017+001	-3.5733+000	-2.6162+000	-7.9931-003
4	-5.2200+000	3.6102+000	4.4481+000	-1.5099+000	-4.8953-002
5	0.0000	0.0000	0.0000	-2.2537+000	0.0000

FP

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	-9.0478+000	-8.7656-001	-3.5775+000	5.2210-001	7.5861+000
SNCOM	-1.5159+000	-8.4314+000	7.7652-001	-2.2407-001	1.8786+000
PT7M	6.8220-001	-8.0726+000	-9.0286+000	2.6780+000	5.5701+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	8.9854+001	2.3875+002	-1.6337+000	4.4559+001	-1.7223+002

F100 LINEAR MODEL 1,2/0K 83 3/3/76

UNNORMALIZED EIGENSYSTEM.

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.78950+002)+J(0.00000)	0.00000	1.00000	1	(-7.91008-001)+J(0.00000)	-.7910078	.00000
			2	(-2.47503-001)+J(0.00000)	-.2475032	.00000
			3	(-3.50281-003)+J(0.00000)	-.0035028	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-7.325 1+000)+J(3.91242+000)	8.30439+000	.88207	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.46220-001)+J(1.32151-001)	.1970891	137.89328
			3	(2.10281-003)+J(-4.85283-003)	.0052888	-66.57214
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.16465-002)+J(8.65264-003)	.0233118	21.78780
(-5.14 43+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(4.04920-001)+J(0.00000)	.4049200	.00000
			3	(5.60560-003)+J(0.00000)	.0056056	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(5.66937-002)+J(0.00000)	.0566937	.00000
(-1.00 00+001)+J(0.00000)	0.00000	1.00000	1	(-6.49369-001)+J(0.00000)	-.6493690	.00000
			2	(-3.72070-002)+J(0.00000)	-.0372070	.00000
			3	(-3.06719-003)+J(0.00000)	-.0030672	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-1.19333-002)+J(0.00000)	-.0119333	.00000

LAMBDA2 INVERSE

	1	2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.7489-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.7321-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-1.9963-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-2.0089-002	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-2.5708-002	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.9651-001	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.2972-002	-1.1362-002	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1362-002	-5.2972-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.9937-002
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2 INVERSE

	11	12
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.00	0.0000
11	-4.7138-002	0.0000
12	0.0000	-5.1145-002

GR

	WFMBH	ANMIX	CIVV	RCVV	BLC
SNFAN	-4.5863-002	-2.0834-002	5.8584-001	-8.3852-004	3.8575+000
SNCOM	7.5670-001	6.5218-001	1.4455-001	1.2479-002	1.0508+000
PT7M	-5.5146-001	-7.1030+000	-1.6960-001	2.1771-002	-2.2471+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	-1.3047+001	-8.6748+000	-7.3204+000	-5.3116-001	-1.9004+002

H*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	1.2473-003	2.5041-002	-6.2133-003	-6.0532-003	1.4435-004
SNCOM	-1.2032-001	-6.2353-001	-4.6693-003	1.9038-002	1.2563+000
PT7M	4.9619-001	-5.9565-001	3.1370-001	-2.7155-001	2.6922-002
WFCOM	4.4362-001	-8.5128-001	4.5735-001	-4.1288-001	2.3566-002
PT3	2.6193-001	2.9064-001	3.7783-001	-4.5357-001	-4.7509-003
FTIT	-1.8679-001	-4.3694-001	2.6580-001	1.8758-001	5.1381-003
PT45	-4.6810-001	-2.8109-001	9.3120-001	-4.1299-001	-8.1110-002
TT25H	-1.5711-001	-4.3286-001	2.1235-001	2.1723-001	-2.9974-002
TT25C	-1.7074-001	-5.3391-001	2.9746-001	1.9016-001	-1.2551-002
TT3	-6.7288-002	-3.5985-002	8.7336-002	3.8099-002	-3.9686-003
TT4PHI	-5.6859-001	-7.4661-001	6.9410-001	7.0343-002	1.5373-002
TT7M	2.8645-001	-1.3557+000	1.0253+000	-1.2844+000	3.2177-002

HR

	FTIT	PT45	TT25H	TT25C	TT3
FNMX	-6.6361-001	-3.3353+000	1.7443+000	-9.0779-001	2.0028+000
WFAN	8.5010-001	3.1824-002	-1.0544-002	2.1996-002	-2.6899-003
TT4	-1.5711-001	-4.3286-001	2.1235-001	2.1723-001	-2.9974-002
SMAF	8.9420-001	2.8317+000	-9.6180-001	5.3245-001	-2.4314-001
SMHC	1.8002+000	3.1096+001	-1.6547+000	1.8999+000	-7.1314+000

F100 LINEAR MODEL 1.2/0K 83 3/3/76

D*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	3.4713-001	-8.3120-003	1.1928-002	1.4610-003	4.6723-001
SNCOM	8.0608-003	1.5483-002	1.5371-002	1.0498-003	5.1744-001
PT7M	2.0972-001	1.7785-001	-4.1645-003	1.2191-003	2.5168-001
WFCOM	3.2720-001	2.5332-001	-1.4803-002	1.7645-003	3.0138-001
PT3	3.6112-001	2.3720-001	2.4209-003	6.6017-004	9.3503-002
FTIT	1.5256-001	2.2234-001	2.8969-002	1.7856-003	4.9086-001
PT45	5.5358-001	6.4522-001	6.1385-002	3.5287-004	6.8479-001
TT25H	1.6463-001	1.7354-001	2.5500-002	1.8207-003	5.1497-001
TT25C	1.7424-001	2.4450-001	3.0451-002	1.9033-003	5.3975-001
TT3	2.9439-001	7.79[illegible]-002	1.8366-002	1.4126-003	5.0682-001
TT4PHI	2.4313-001	4.8185-001	5.9783-002	2.1530-003	8.7763-001
TT7M	1.0693+000	6.7461-001	7.5326-003	2.3133-003	7.3640-001

DR

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	7.4790-001	6.7865-001	6.7122-002	7.1723-003	1.9478+000
WFAN	-4.3180-003	9.5704-003	-8.4685-002	-7.9919-005	2.1605-002
TT4	1.6463-001	1.7354-001	2.5500-002	1.8207-003	5.1497-001
SMAF	-3.9951-001	-3.1185-001	3.8840-001	-7.4984-003	-4.0818-001
SMHC	-1.7220+000	-1.3046+000	-3.8477-001	-1.0885-002	-8.0923-001

```
PROCESSED BY UNIVAC 1100 SERIES ELT PROCESSOR LEVEL W8 AT 11:32:49 AM ON WEDNESDAY, MARCH 3, 1976  (CREATING CYCLE 0)

F                           REDUCED MATRICES     1.2/OK    83      FIFTH ORDER
  -.9048+01 -.6953+00 -.5895+03  .3614+00  .1322+03
  -.1911+01 -.8431+01  .1613+03 -.1955+00  .4126+02
   .4140-02 -.3886-01 -.9029+01  .1125-01  .5889+00
   .0000     .0000     .0000    -.1000+02  .0000
   .5158+01  .1087+02 -.1545+02  .1770+01 -.1722+03
G                           REDUCED MATRICES     1.2/OK    83      FIFTH ORDER
  -.3175-01 -.6505+02 -.3220+03  .5037+01  .4062+05
   .6603+00  .2567+04 -.1002+03 -.9450+02  .1395+05
  -.2316-02 -.1345+03  .5657+00 -.7936+00 -.1436+03
   .1000+02  .0000     .0000     .0000     .0000
  -.5184+00 -.1555+04  .2309+03  .1831+03 -.1149+06
HY                          REDUCED MATRICES     1.2/OK    83      FIFTH ORDER
  -.8363+00 -.3334+01  .3622+03 -.7918+00  .4397+02
   .3377-01  .1003-02 -.6902-01  .6047-03 -.1861-02
  -.4510-01 -.9856-01  .1004+02  .4316-01 -.1499+00
   .2487-04  .6247-04 -.4408-02  .1025-04 -.1178-03
   .2510-04  .3439-03 -.3801-02  .1833-04 -.1732-02
DY                          REDUCED MATRICES     1.2/OK    83      FIFTH ORDER
   .6524+00  .2670+04 -.4649+02 -.5429+02  .2585+05
  -.1187-03  .1187+01  .1849+01  .1907-01  .9036+01
   .3271-01  .1555+03 -.4023+01 -.3139+01  .1557+04
  -.7690-05 -.2708-01 -.5936-02  .1253-02 -.1195+00
  -.1662-04 -.5679-01  .2948-02  .9115-03 -.1188+00
```

CASE 5

```
THE REDUCED MATRICES FR,GR,HR,DR WILL BE SAVED FOR OPTSYS ON FILE 12
INTERMEDIATE DATA WILL BE READ FROM RECORD NO. 10 OF FILE 10

THERE WILL BE 10 EIGENVALUES ELIMINATED. THE TOLERANCE LEVEL FOR ELIMINATION IS       .100
   3 OF THESE EIGENVALUES ARE COMPLEX. TO BE ELIMINATED ARE--
( -.250000+000,  .000000     )
( -.490300+003,  .000000     )
( -.509000+002,  .000000     )
( -.574000+002,  .000000     )
( -.448000+002,  .160000+001)
( -.693000+000,  .000000     )
( -.170000+002,  .266000+001)
( -.194000+002,  .000000     )
( -.205000+002,  .390000+000)
( -.199000+001,  .000000     )

THE IDENTIFYING TITLE FOR FR,GR,HR,DR ON OPTSYS OUPUT *REDUCED MATRICES     .9/30K   20     FIFTH ORDER
```

F100 LINEAR MODEL .9/30K 20 3/9/76

LAMBDAI

	1	2	3	4	5
1	-1.1929+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.1699+000	3.9200-001	0.0000	0.0000
3	0.0000	-3.9200-001	-1.1599+000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-6.5333+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

TI1

	1	2	3	4	5
1	-9.2074-003	3.2840-001	-2.5190-001	7.6977-002	-5.4524-002
2	-1.3486-003	4.1644-002	2.8454-002	1.5555-002	-2.3426-002
3	-2.3755-002	2.5257-001	-2.2565-001	1.0000+000	-5.0762-001
4	0.0000	0.0000	0.0000	0.0000	1.0000+000
5	9.1558-001	2.3013-001	2.7629-003	1.9710-001	2.6700-002

XI1

	1	2	3	4	5
1	7.1557-001	1.3346+000	-2.0755+000	-1.1847+001	-1.5517+002
2	1.8412+000	2.1172+000	4.8290-002	3.3867-002	-4.5746+000
3	2.1111+000	5.8536-001	8.5720-002	4.2629-001	-5.2994+000
4	5.0527+000	-6.4595+000	-1.4969-001	1.4443-001	-4.5592+000
5	1.0000+001	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL .9/30K 20 3/9/76

T21

	1	2	3	4	5
1	-1.0149-005	2.6555-003	4.7787-003	-1.0365-003	-6.7289-003
2	1.0000+000	2.6550-001	-8.1975-002	4.5560-001	-8.8135-002
3	8.6021-004	7.6249-002	-7.1209-002	8.3916-002	-6.3033-002
4	1.0237-003	8.2579-002	-9.4660-002	1.8252-001	-1.2910-001
5	-4.6838-002	8.0303-002	-3.1637-003	8.5927-002	-5.5705-002
6	5.5623-003	-3.7180-002	-3.3922-003	-1.7955-002	5.9284-001
7	7.1417-004	1.9648-002	2.1509-002	-6.1568-004	4.2360-002
8	-3.6658-003	-4.6039-002	-3.7785-003	-2.3877-002	5.1847-001
9	9.9717-003	-3.0362-002	-2.6887-002	5.5114-002	5.4868-001
10	3.8884-003	-6.4691-002	-2.4909-002	7.7189-003	1.3652-001
11	4.3410-002	-4.7400-002	-5.1556-002	2.1291-001	7.5305-001
12	-1.0983-004	8.4980-002	-1.0044-001	2.7149-001	-2.5720-001
13	-1.2886-001	-2.4002-002	-6.9423-003	3.2642-001	3.8751-001

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	6.8338-006	8.3262-004	-2.1208-003	-6.3729-003	2.9327-003	2.1161-002	4.8366-003	8.0324-003	-1.0717-004
2	0.0000	1.0000+000	2.9502-002	-4.8513-002	2.2032-001	-1.3223-001	3.4449-001	-9.2085-001	-4.6189-001	8.6123-002
3	0.0000	1.0805-004	2.8780-004	1.5566-003	7.4071-003	-4.5069-003	8.7126-002	1.5799-001	-2.1275-001	-1.0287-002
4	0.0000	1.7311-004	3.4402-004	1.5468-003	8.0325-003	-4.0331-003	8.6624-002	1.5284-001	-5.4009-001	3.0483-002
5	0.0000	-1.0902-004	-7.0995-004	5.4786-003	-6.4710-003	6.3190-003	1.0356-001	-5.3343-001	-4.9702-001	1.8614-002
6	0.0000	3.7786-005	-1.8364-003	3.0382-001	-1.3043+000	-2.6175-001	-4.6843-002	-7.1238-001	-8.4202-001	-1.5415-003
7	0.0000	4.8971-006	-2.2432-004	3.7414-002	-1.5099-001	-3.0861-002	1.0000+000	-7.5240-002	-7.9429-002	-1.6475-004
8	0.0000	-2.7457-004	1.4689-004	-4.9325-002	-1.3625-001	-7.5511-002	-5.8706-002	-4.1705-001	-6.0181-001	-2.4870-003
9	0.0000	-2.7004-002	-3.4849-001	1.0000+000	2.3073+000	-1.1637+000	-7.0253-002	-8.5130-001	-1.0159+000	1.7002-002
10	0.0000	-1.0733-002	-1.3084-001	3.7836-001	8.5725-001	-4.3536-001	-9.3744-002	-2.8685-001	-3.1633-001	5.6380-003
11	0.0000	-3.5681-003	-3.2494-002	1.6025-001	3.1610-002	-9.9640-002	-1.1106-001	-3.1650+000	-1.3342+000	-3.5737-001
12	0.0000	-3.9397-006	-1.9092-004	-7.4092-004	-6.4479-003	2.6670-003	8.8933-002	-1.2786+000	-2.5154+000	1.0000+000
13	0.0000	-1.6620-002	1.0000+000	-5.8146-001	7.8510-002	-5.4161-001	-6.7669-002	-3.9147+000	-2.3562+000	3.5809-001

T22

	11	12	13
1	5.2145-003	2.0774-003	-7.9104-003
2	-5.1020-001	-9.0413-001	-1.1219-001
3	3.3258-001	8.3223-002	-6.2968-002
4	3.4655-001	3.4728-001	-9.5817-002
5	-1.2181+000	-2.6251-001	-3.1096-002
6	-1.2214+000	-1.5121-001	1.4538-002
7	-1.2750-001	-1.4986-002	-4.4707-003
8	-6.7464-001	-8.5535-002	1.7738-002
9	-8.9541-001	-3.3312-001	7.3056-003
10	-2.9654-001	-1.1041-001	1.0000+000
11	1.0227+001	6.9298+000	-3.9256-002
12	-2.3578+000	-1.3335+001	-7.4337-002
13	8.1214+000	-2.9178+000	-3.5707-002

FI00 LINEAR MODEL .9/30K 20 3/9/76

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-4.8033+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-5.0981+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-5.7419+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-4.4854+001	1.6038+000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	-1.6038+000	-4.4854+001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-6.9357-001	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.7078+001	2.6636+000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.6636+000	-1.7078+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.9390+001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-2.0585+001	3.0423-001	0.0000
12	-3.0423-001	-2.0585+001	0.0000
13	0.0000	0.0000	-1.3918+000

TI2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-2.1404-003	2.4200-003	-6.2482-003	-2.4626-002	1.1192-002	4.0737-001	6.7213-002	3.2461-002	-4.3502-003
2	0.0000	7.5989-004	2.1500-004	-3.3134-003	1.4994-002	1.9108-003	6.0188-002	1.6856-003	7.6875-003	1.0252-003
3	0.0000	-5.5491-003	5.7993-003	7.2863-003	2.3246-002	-2.7012-002	2.3247-001	1.6744-001	2.7635-002	-6.4198-003
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	5.9985-004	2.6006-003	-5.2947-002	-3.4967-002	-2.3127-003	2.9905-001	-4.2420-001	1.0110-001	4.2479-002

F100 LINEAR MODEL .9/30K 20 3/9/76

T12

	11	12	13
1	4.1421-002	4.1924-002	-2.0478-001
2	3.3930-002	-5.5957-003	-2.0481-003
3	-6.4574-001	-4.0590-002	-2.8700-001
4	0.0000	0.0000	0.0000
5	-1.1540+000	-3.8308-001	-8.4090-002

H1

	1	2	3	4	5
1	-1.1649+000	-6.3876+000	3.7113+000	6.0284-001	3.5373-001
2	1.1079+000	2.0425-001	-7.4459-002	-6.4548-003	-3.9165-004
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	4.0733+000	4.2280+000	-1.4554+000	-1.7706-001	-7.5755-003
5	2.4776+000	1.0032+001	9.6353-001	3.4919-001	-4.5223+000
6	6.1241-001	1.0657-001	-4.0907-001	-6.6451-002	1.3550-002
7	2.0347-001	4.3641-002	-1.1735-001	-1.4284-002	2.8010-003

H2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	3.0656+000	3.0223+000	-5.0626-001	-4.0958-001	3.1123-001	-8.5742-002	-1.9913+000	-1.3573-001	-1.4748-001
2	0.0000	2.1541-003	-1.3984-001	-5.2341-002	2.3498-003	2.3011-003	2.3988-003	2.3498-003	2.3986-003	2.3982-003
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000
4	0.0000	4.2854-002	-2.7385+000	-1.0240+000	4.6942-002	4.5565-002	4.7321-002	4.6412-002	4.7318-002	4.7768-002
5	0.0000	-2.8202-002	-7.2362+000	6.7861-001	-3.1379-002	-3.0019-002	-3.1246-002	-3.1250-002	-3.1574-002	-3.1249-002
6	0.0000	1.4798-002	-4.1339-002	-4.3747-002	1.5857-002	1.5623-002	1.5865-002	1.6028-002	1.5655-002	1.6212-002
7	0.0000	3.1636-003	1.0398-002	1.4680-002	3.3976-003	3.5054-003	3.3983-003	3.3981-003	3.3977-003	3.4098-003

H2

	11	12	13
1	1.5163+000	1.0332+000	-1.3572-001
2	1.9091-003	-2.9376-003	2.3992-003
3	0.0000	0.0000	0.0000
4	3.7933-002	-5.4704-002	4.7307-002
5	-2.4896-002	3.7738-002	-3.1374-002
6	1.2850-002	-2.0440-002	1.5856-002
7	2.6706-003	-4.9720-003	3.3935-003

F100 LINEAR MODEL .9/30K 20 3/9/76

XT2

	1	2	3	4	5
1	3.7307-002	-5.6393-003	9.0749-004	3.0948-003	8.2670-002
2	2.2358+000	6.6117+000	-7.3715-001	4.4571+000	2.9560+002
3	3.0115+001	5.7579+000	-1.0840+000	-1.8117+001	-2.5764+002
4	3.3125+001	4.3209+000	-2.1524+000	-1.5578+001	-2.2681+002
5	5.3866+000	8.2423-001	-1.4533-001	-1.5367+000	-2.1437+001
6	3.1624+001	3.9165+000	-1.4390+000	-1.1270+001	-1.6913+002
7	1.4630-001	-3.3575-002	2.0342-003	9.2060-003	4.0485-001
8	1.9032+000	6.8787-001	9.5220-002	1.4453-001	-1.1322-001
9	-5.6127-001	-1.5747+000	-2.3233-001	-1.4022-001	2.6772+000
10	9.7312-001	1.2537+000	-2.7795+000	1.6687+000	2.4640+001
11	-3.4278-001	4.4850-002	5.1902-002	1.4347-001	2.4077+000
12	-4.0378-002	1.0392-001	-1.8532-001	1.1216-001	8.3503-001
13	7.0829-001	1.0555-001	2.2100-002	6.1811-002	2.2572-001

T̄1 INVERSE

	1	2	3	4	5
1	-2.2961-001	-3.2805+000	-1.4415-001	-2.0776-001	1.0795+000
2	1.7001+000	1.2424+001	-3.3075-001	2.7710-001	3.3597-002
3	-2.0156+000	1.6474+001	-1.0305-001	3.0578-001	1.0307-002
4	-8.8989-001	5.0140-001	1.0569+000	5.0170-001	1.9496-002
5	0.0000	0.0000	0.0000	1.0000+000	0.0000

FP

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	-1.1653+000	-4.2561-001	-6.3737-001	1.1481-001	1.1705+000
SNCOM	-2.8046-002	-1.8174+000	-1.1730-001	1.6529-001	2.3386-001
PT7M	4.8613+000	-9.1566+000	-7.2811+000	1.2631+000	2.9298+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	2.5582+001	3.5567+002	1.4463+001	2.1730+001	-1.1794+002

F100 LINEAR MODEL .9/30K 20 3/9/76

UNNORMALIZED EIGENSYSTEM.

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.19293+002)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(3.16410-001)+J(0.00000)	.3164100	.00000
			3	(3.23108-003)+J(0.00000)	.0032311	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-9.27943-001)+J(0.00000)	-.9279431	.00000
(-6.53325+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(3.18455-001)+J(0.00000)	.3184547	.00000
			3	(1.62622-002)+J(0.00000)	.0162622	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.39005-002)+J(0.00000)	.0239005	.00000
(-1.18988+000)+J(3.91995-001)	1.25279+000	.94979	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(5.98854-002)+J(1.82448-001)	.1920253	71.82853
			3	(1.02139-003)+J(-7.66909-005)	.0010243	-4.29396
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(4.07890-003)+J(3.20660-003)	.0051884	38.17242
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(-4.19044-001)+J(0.00000)	-.4190443	.00000
			2	(-3.44319-001)+J(0.00000-)	-.3443189	.00000
			3	(-4.88381-003)+J(0.00000)	-.0048838	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.91492-003)+J(0.00000)	.0019149	.00000

LAMBDA2 INVERSE

	1	2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-2.0819-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.9615-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-1.7416-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-2.2266-002	-7.9614-004	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	7.9614-004	-2.2266-002	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.4418+000	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.7163-002	-8.9151-003	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.9151-003	-5.7163-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.1573-002
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2 INVERSE

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-4.8562-002	-9.3004-004	0.0000
12	9.3004-004	-4.8562-002	0.0000
13	0.0000	0.0000	-5.0200-001

G*

	WFNBH	ANMTX	CIVV	RCVV	HLC
SNFAN	-6.2440-002	3.8226-002	1.0885-002	9.2905-003	8.4126-001
SNCOM	-4.3101-002	2.9113-003	8.8403-003	3.5871-002	-1.2399-001
PT7M	-2.1254-001	-6.0549+000	-9.1662-002	2.6669-001	-1.8874+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	-5.9642+000	-2.8133+000	-2.5065+000	-1.0032+001	-1.2615+002

H*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	-4.1973-003	1.1123-001	-2.4647-003	-5.0497-003	1.0729-004
SNCOM	-1.8585-002	-1.1037+000	2.5828-001	-1.8693-002	1.0965+000
PT7M	1.9836-001	-1.8599-001	7.0682-002	-2.1756-002	4.3924-003
WFCOM	1.6843-001	-4.4535-001	1.7520-001	-4.3804-002	6.4621-003
PT3	7.7191-002	1.1423+000	7.1329-002	1.8420-002	-4.6222-002
FTIT	-4.1668-002	-5.4507-001	-7.1300-003	5.7134-001	4.3700-003
PT45	-9.7486-003	5.9745-001	-9.4791-003	5.3954-002	1.6418-003
TT25H	-4.8561-002	-6.3419-001	-9.0595-003	4.9334-001	-6.0086-003
TT25C	-4.8733-002	-8.2522-001	6.9023-002	5.5763-001	1.0542-002
TT3	-6.7511-002	-1.2230+000	3.1561-002	1.1404-001	1.9180-003
TT4PHI	-1.7607-001	-1.4740+000	2.3975-001	8.2195-001	4.8689-002
TT4PLO	1.0544-001	-4.6230-001	2.6919-001	-1.2820-001	6.9942-003
TT4	-2.8770-001	1.7387-001	3.7221-001	5.6926-001	-1.3364-001

F100 LINEAR MODEL .9/30K 20 3/9/76

HP

	FTIT	PT45	TT25H	TT25C	TT3
FNMX	-5.7874-001	-1.2147+001	5.2561+000	6.0972-001	3.8590+000
WFAN	1.0697+000	2.4668-001	-9.2047-002	6.4094-003	6.9113-004
TT4	-4.8561-002	-6.3419-001	-9.0695-003	4.9334-001	-6.0086-003
SMAF	3.3238+000	5.0569+000	-1.7989+000	7.6129-002	1.4322-002
SMHC	1.1789+000	1.1170+001	5.5155-001	3.7826-001	-4.5763+000
DP25QT	5.8534-001	8.6583-002	-5.0001-001	-1.2947-002	2.7146-002
DP25SC	2.0550-001	2.5475-002	-1.1210-001	-4.2374-003	5.9606-003

D*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	1.4951-001	-2.8407-002	3.5110-003	1.2161-002	3.3836-001
SNCOM	-2.8978-002	5.7467-002	6.6595-003	2.9534-002	8.3415-001
PT7M	1.6621-002	2.5615-002	5.0353-003	5.4465-003	8.3007-003
WFCOM	3.3450-002	6.2268-002	1.3096-003	1.3541-002	2.5059-002
PT3	-8.3766-003	3.0161-002	1.6922-003	-9.0477-003	-2.3964-001
FTIT	-2.0711-001	3.0487-002	1.0997-002	3.3079-002	2.9506-001
PT45	1.7605-001	-4.5158-002	5.1417-003	1.6416-002	6.0105-001
TT25H	-1.0026-001	3.1246-002	1.1432-002	3.5217-002	3.7575-001
TT25C	-1.8919-001	5.8433-002	1.3199-002	4.0229-002	4.6925-001
TT3	3.2829-001	6.8398-002	1.0656-002	4.4603-002	2.9312-001
TT4PHI	-4.6717-001	1.1630-001	1.9413-002	5.6678-002	6.2292-001
TT4PLO	1.0138-001	1.4410-001	3.6623-003	1.3670-002	6.8735-002
TT4	-3.5442-001	1.6435-001	1.3412-002	2.8471-003	1.1420-001

DR

	XFNPM	ANMTX	CTVV	RCVV	BLC
FNMX	-4.9531-001	-2.6503-002	9.1726-002	3.6402-001	2.1600+000
WFAN	-6.1537-003	-6.4965-003	-3.6795-002	-8.0506-003	1.3945-002
TT4	-1.0026-001	3.1246-002	1.1432-002	3.5217-002	3.7575-001
SMAF	-1.2067-001	-2.6209-001	4.8218-001	-1.7230-001	-3.6235-001
SMHC	-7.0353-002	2.0653-002	-9.8354-002	3.6771-001	-7.3519-001
DP25QT	-1.6176-002	2.5346-002	-2.5695-003	-2.0094-003	1.4269-001
DP25SC	-2.4048-003	6.8531-003	-5.1159-003	-7.0646-004	3.2454-002

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@ELT,IL    KEN*F100ALT,SRR83-09-30
PROCESSED BY UNIVAC 1100 SERIES ELT PROCESSOR LEVEL W8 AT 5:01:29 PM ON TUESDAY, MARCH 9, 1976  (CREATING CYCLE 0)

   1.    F                              REDUCED MATRICES      .9/30K    20       FIFTH ORDER
   2.       -.1165+01 -.2701+00 -.5092+03  .3623+00  .1254+03
   3.       -.4420-01 -.1817+01 -.1477+03  .2002+01  .3949+02
   4.        .5064-02 -.7273-02 -.7281+01  .1215-01  .3930+00
   5.        .0000     .0000     .0000    -.1000+02  .0000
   6.        .2387+00  .2106+01  .1078+03  .1558+01 -.1179+03
   7.    G                              REDUCED MATRICES      .9/30K    20       FIFTH ORDER
   8.       -.4799+00  .7741+03 -.4832+01 -.2920+01  .5111+04
   9.       -.5220+00  .9291+01 -.3386+01 -.1777+02 -.1187+04
  10.       -.2045-02 -.1535+02  .2788-01 -.1049+00 -.1435+02
  11.        .1000+02  .0000     .0000     .0000     .0000
  12.       -.4277+00 -.5317+02  .5620+01  .2942+02 -.7152+04
  13.    HY                             REDUCED MATRICES      .9/30K    20       FIFTH ORDER
  14.       -.3483-01 -.4638+00  .2527+03  .2620+00  .2488+02
  15.        .1098-01  .1606-02 -.7546+00  .5055-03  .7000-03
  16.       -.1272-01 -.1054+00 -.1902+01  .9933+00 -.1087+00
  17.        .1154-03  .1114-03 -.4989-01  .2031-04  .5328-04
  18.        .3569-04  .2146-03  .1334-01  .8600-04 -.1485-01
  19.        .9534-04  .9043-05 -.6574-01 -.1036-04  .4788-03
  20.        .3382-04  .2661-05 -.1475-01 -.5360-05  .1051-03
  21.    DY                             REDUCED MATRICES      .9/30K    20       FIFTH ORDER
  22.       -.2291+00 -.3230+01 -.1341+01 -.6884+01  .7697+03
  23.       -.4853-03 -.1350+00  .9176-01  .2596-01  .8694+00
  24.       -.2019+00  .1658+02 -.7276+00 -.2899+01  .5980+03
  25.       -.3219-04 -.1843-01 -.4066-02  .1880-02 -.7042-01
  26.       -.1637-04  .1266-02  .7235-03 -.3498-02 -.1352+00
  27.       -.2046-04  .8449-02  .1027-03  .1039-03  .1427+00
  28.       -.3042-05  .2264-02  .2046-03  .3654-04  .3245-01

END ELT.  TIME: 2.2494 SECONDS.

@FTN
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CASE 6

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THE REDUCED MATRICES FR,GR,HR,DR WILL BE SAVED FOR OPTSYS ON FILE 12
INTERMEDIATE DATA WILL BE READ FROM RECORD NO.  6 OF FILE 10

THERE WILL BE 10 EIGENVALUES ELIMINATED. THE TOLERANCE LEVEL FOR ELIMINATION IS        .100
  2 OF THESE EIGENVALUES ARE COMPLEX. TO BE ELIMINATED ARE--
( -.250000+000,  .000000      )
( -.830700+003,  .000000      )
( -.869000+002,  .000000      )
( -.498700+002,  .140000+000)
( -.201000+001,  .000000      )
( -.[illegible]+002,  .537900+001)
( -.240100+002,  .000000      )
( -.195100+002,  .000000      )
( -.212300+002,  .000000      )
( -.204000+002,  .000000      )

THE IDENTIFYING TITLE FOR FR,GR,HR,DR ON OPTSYS OUPUT =REDUCED MATRICES   0/0K  20   FIFTH ORDER
```

F100 LINEAR MODEL 0/0K 20 2/17/76

LAMBDA1

	1	2	3	4	5
1	-1.4442+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-7.5659-001	0.0000	0.0000	0.0000
3	0.0000	0.0000	-5.1471+000	2.2711+000	0.0000
4	0.0000	0.0000	-2.2711+000	-5.1471+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

T11

	1	2	3	4	5
1	-1.2653-002	9.0600-001	9.1467-001	-2.8565-001	-6.4656-002
2	-5.6634-003	2.1906-001	-3.9552-002	2.3859-002	-2.6611-002
3	-2.1300-002	1.2738-001	1.6089-001	-1.2082-001	1.0109-001
4	0.0000	0.0000	0.0000	0.0000	9.2743-001
5	1.0000+000	1.0000+000	-2.0934-001	3.7969-001	1.0026-001

XI1

	1	2	3	4	5
1	1.0950+001	9.5944+000	-3.4374+000	-3.4801+001	-1.0593+002
2	9.6567-001	1.8764-001	6.6648-003	-1.1622-002	-1.8668+000
3	1.0520+000	6.6615-001	1.1316-001	-3.4974-001	-2.7781+000
4	3.4817+000	2.1597+000	1.8588-001	-4.5862-001	-5.9970+000
5	1.0782+001	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL 0/0K 20 2/17/76

T21

	1	2	3	4	5
1	-9.6752-005	1.0646-001	-9.0366-003	8.4137-003	-8.2872-003
2	4.8155-001	4.9355-001	1.5770-002	9.0041-002	1.2976-001
3	-5.0691-003	1.4594-001	3.1690-001	-3.9728-001	-2.2067-002
4	-7.1068-003	1.3139-001	3.5640-001	-4.9749-001	-5.3932-003
5	[illegible]	[illegible]	7.4174-002	-1.8738-001	2.0511-002
6	2.3557-002	-2.5732-001	1.4275-001	-3.8635-001	6.2600-001
7	-4.4994-002	-2.9940-001	1.5177-001	-3.5304-001	5.4302-001
8	1.0836-001	-3.7981-001	2.1007-001	-4.8800-001	6.3721-001
9	4.2426-002	-5.1633-001	-5.6167-002	-1.1121-001	1.5989-001
10	5.4601-002	-4.7166-001	2.4043-001	-6.8714-001	1.0000+000
11	1.3700-003	1.3923-001	3.6087-001	-7.1986-001	-1.0487-002
12	-1.0701-001	-1.4690-001	-3.1120-002	-6.2948-001	8.0029-001

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	2.7497-006	-7.1767-005	2.3779-003	2.7350-004	-6.6215-003	-7.0342-004	-5.8002-003	7.4963-004	8.8388-005
2	0.0000	1.0000+000	4.5690-001	1.7052-004	-1.6926-003	-3.9499-002	1.6235-003	-2.7685-001	-7.1633-002	-6.1368-002
3	0.0000	-6.3889-004	-3.8196-002	2.0876-003	-1.7189-003	-2.9971-002	-1.2748-001	1.4510-001	-5.0646-002	7.1348-003
4	0.0000	-7.9421-004	-5.0000-002	-4.7545-004	1.5058-003	-2.1562-002	-1.5032-001	1.8380-001	-6.5183-002	2.4131-002
5	0.0000	5.6068-004	-3.4121-002	-1.2194-004	3.2761-004	-1.5102-002	1.3505-001	1.9488-002	9.5580-002	-1.7419-002
6	0.0000	-1.6301-004	-1.7152-001	-9.6563-001	9.0772-001	-7.8166-003	5.7638-001	8.5323-001	-3.1214-002	6.0949-004
7	0.0000	2.9298-003	1.4156-001	-5.3631-003	-5.5117-004	-6.8463-003	1.5062-001	5.7184-001	-2.5586-002	1.8797-003
8	0.0000	-1.7725-002	4.8338-002	-9.1869-001	-1.0303-001	-1.6194-002	5.1121-001	1.0605+000	-1.3907-001	-1.3315-002
9	0.0000	-7.0636-003	1.8652-002	-3.4447-001	-3.8582-002	1.0000+000	1.9886-001	3.6637-001	-4.8108-002	-4.4113-003
10	0.0000	-1.9426-003	4.5741-002	-4.3677-002	-2.0707-003	-3.1416-002	1.1819+000	-6.6022-001	5.3506-001	-5.5169-001
11	0.0000	-2.5391-006	1.3675-002	-2.2029-003	1.9027-003	-2.1697-002	4.7593-001	8.7778-002	3.1508-001	1.0000+000
12	0.0000	-2.2478-002	-4.1728-001	-6.4283+000	7.3952+000	6.4925-002	1.4037+000	-1.7976+000	1.0000+000	-2.3577-002

T22

	11	12
1	-6.3432-004	-2.0354-004
2	1.4949-002	-6.6215-002
3	-4.8855-002	4.1059-003
4	-6.4346-002	-2.0561-002
5	1.7888-001	1.5761-002
6	1.5858-001	5.1470-002
7	8.3956-002	3.1743-002
8	1.0400-001	3.2055-002
9	3.5157-002	1.0748-002
10	-4.9217-001	-4.7433-001
11	1.0000+000	1.0000+000
12	1.3226-001	6.2315-002

F100 LINEAR MODEL 0/0K 20 2/17/76

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-8.3070+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-8.6902+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-4.9880+001	1.4080-001	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	-1.4080-001	-4.9880+001	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-2.0184+000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.4687+001	8.3792+000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-8.3792+000	-2.4687+001	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.4016+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.9518+001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
11	2.1236+001	0.0000
12	0.0000	-2.0402+001

T12

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-4.4267-003	-7.7850-003	1.5017-002	8.7290-004	-2.8398-001	-4.7296-002	-3.926[illegible]-002	-1.3888-002	-1.0547-003
2	0.0000	8.3155-004	-8.2083-003	2.4378-004	-1.4393-004	-1.6060-003	-6.5575-003	-5.4374-003	-5.4658-003	-1.1043-003
3	0.0000	-4.7584-003	-2.6736-002	4.4273-003	-4.6109-003	-4.6235-002	-2.4249-001	-8.4541-002	-2.5241-001	-9.4347-002
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	-2.3001-002	1.0000+000	-8.1174-003	4.6362-003	-1.1788-002	2.7071-001	-6.2925-001	1.5641-001	-3.1979-002

T12

	11	12
1	-2.1121-002	-4.6996-003
2	-6.4402-003	-2.4339-003
3	-1.1146-001	-1.1538-001
4	0.0000	0.0000
5	1.6215-001	-2.0058-002

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H1

	1	2	3	4	5
1	4.9947-001	-2.1214+000	4.2398+000	3.5081-001	1.1361-001
2	9.0297-001	2.3190-001	-2.6958-001	2.1503-001	-6.6778-002
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	-1.4418+000	5.2568+000	-6.1130+000	4.8339+000	-1.5141+000
5	7.2668+000	1.3004+002	8.1094+000	-2.9858+000	-1.3783+001
6	9.8066-002	-4.9151-002	-5.4347-001	4.1866-001	-1.0737-001
7	5.4398-002	-3.3075-002	-1.1506-001	8.8020-002	-2.1284-002

H2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	1.0278+000	1.0368+000	-1.2261-001	-1.8866-001	6.4364-001	-1.0757+000	-7.9507-002	-8.1457-002	2.4483-001
2	0.0000	-4.3330-002	-2.3344-001	-7.5807-002	-9.2579-002	4.1082-001	-5.2544-001	-5.1405-002	-5.1190-002	-4.9442-002
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000	0.0000
4	0.0000	-9.8159-001	-5.2935+000	-1.7189+000	-2.0994+000	9.3108+000	-1.1911+001	-1.1650+000	-1.1607+000	-1.1195+000
5	0.0000	1.3071+000	-6.8987+001	2.2853+000	2.7896+000	-1.2379+001	1.5837+001	1.5480+000	1.5421+000	1.4932+000
6	0.0000	-8.8413-002	-1.4872-001	-7.5097-002	-1.8807-001	8.3175-001	-1.0643+000	-1.0389-001	-1.0404-001	-1.0020-001
7	0.0000	-1.8840-002	2.4514-003	-5.9414-004	-4.0024-002	1.7691-001	-2.2629-001	-2.2082-002	-2.2060-002	-2.1185-002

H2

	11	12
1	7.9014-002	-8.3993-002
2	-5.7018-002	-5.1320-002
3	0.0000	0.0000
4	-1.2923+000	-1.1642+000
5	1.7175+000	1.5515+000
6	-1.1591-001	-1.0387-001
7	-2.4872-002	-2.2074-002

XI2

	1	2	3	4	5
1	-3.8078-002	-2.1578-002	7.6091-005	1.1536-002	2.4225-001
2	-2.3542-001	-2.5710+000	6.3212-002	8.3397+000	7.2764+001
3	-1.3377+001	-4.9114+000	1.2261+000	1.1774+001	4.6052+001
4	-2.4490+000	-9.6846-001	-1.0701-001	1.0233-003	-5.0187-001
5	-3.3057+000	-9.1990-001	-9.9482-003	1.6899-001	3.3374+000
6	1.1162+000	8.4827-002	1.4690-002	7.3252-002	-3.5732-001
7	-1.2032+001	-5.5245+000	1.3676-001	2.4335+000	-2.2491+000
8	-2.1172-001	4.7293+000	2.2746-001	1.7375+000	8.6832+000
9	1.4167+001	1.8361+001	2.5678-001	-1.9967+000	7.7179+000
10	3.6428-001	3.2014+000	-3.6421-001	7.6336-001	7.0553+000
11	1.4585+000	-3.5837+000	-2.2027-001	-2.6604+000	-2.8850+001
12	1.7567+000	-1.8376+000	5.0035-001	8.7314-001	1.6259+001

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T11 INVERSE

	1	2	3	4	5
1	-6.4955-001	-4.6698+000	3.9090+000	-7.1874-001	1.0486+000
2	3.3810-002	3.8020+000	7.9299-001	2.0811-002	3.8851-002
3	1.8857+000	-3.2630+000	-5.4507+000	6.4395-001	-1.1072-001
4	2.6613+000	4.8649-001	-1.5389+001	1.9085+000	-2.9136-001
5	[illegible]	0.0000	0.0000	1.0782+000	0.0000

FR

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	5.7957-001	4.1190+000	-2.5809+001	3.5276+000	1.3083+000
SNCOM	-8.2107-001	-5.0407+000	5.5238+000	-6.1399-001	8.9665-001
PT7M	-4.1820-001	-1.2445+001	-2.2584-001	-1.7755+000	2.9957+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	8.7724+001	6.6967+002	-5.2894+002	9.8207+001	-1.5079+002

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UNNORMALIZED EIGENSYSTEM.

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.44423+002)+J(0.00000)	0.00000	1.00000	1	(-6.70937-001)+J(0.00000)	-.6709372	.00000
			2	(-7.08996-001)+J(0.00000)	-.7089965	.00000
			3	(-4.66652-003)+J(0.00000)	-.0046665	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-5.14710+000)+J(2.27109+000)	5.62588+000	.91490	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.10538-001)+J(2.70604-002)	.1138023	166.24422
			3	(8.17452-004)+J(-2.90430-004)	.0008675	-19.55945
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(-6.16009-003)+J(5.90452-003)	.0085329	136.21353
(-7.56595-001)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(6.41652-001)+J(0.00000)	.6416520	.00000
			3	(6.52944-004)+J(0.00000)	.0006529	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(2.33973-002)+J(0.00000)	.0233973	.00000
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(-2.41145-001)+J(0.00000)	-.2411449	.00000
			2	(-2.34314-001)+J(0.00000)	-.2343136	.00000
			3	(1.55778-003)+J(0.00000)	.0015578	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(7.05185-003)+J(0.00000)	.0070518	.00000

LAMBDA2 INVERSE

	1	2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.2038-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.1507-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-2.0048-002	-5.6589-005	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	5.6589-005	-2.0048-002	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-4.9545-001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-3.6322-002	-1.2328-002	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2328-002	-3.6322-002	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.1638-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-5.1234-002
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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LAMBDA2 INVERSE

	11	12
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
11	-4.7090-002	0.0000
12	0.0000	-4.9015-002

GR

	WFMAH	ANMIX	CIVV	RCVV	BLC
SNFAN	-2.0941+000	-4.0165+000	-6.2944-002	-1.0614-001	-3.6998+000
SNCOM	5.3593-001	1.0345+000	3.8363-002	1.3068-001	6.2265-001
PT7M	1.4252+000	5.4264-002	2.8043-002	3.9505-001	1.9109+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	-6.2085+001	-9.6925+001	-4.2002+000	-2.1185+001	-1.4623+002

H*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	9.0141-003	4.3880-001	3.8212-003	3.5875-003	2.5838-003
SNCOM	-2.6734-002	-3.7991-001	8.0214-001	-1.3922-002	4.9614-001
PT7M	-4.5151-001	-6.4878-001	4.4823+000	-5.7124-001	8.1019-002
WFCOM	-6.4288-001	-8.7222-001	5.7897+000	-7.1791-001	1.0314-001
PT3	-3.2715-001	9.1751-001	2.5751+000	-2.5745-001	2.2095-002
FTIT	-7.8290-001	-1.7424+000	5.0552+000	9.4831-003	1.1146-001
PT45	-6.3425-001	-1.5952+000	4.1923+000	3.5598-002	2.7244-002
TT25H	-9.9584-001	-2.8729+000	6.4872+000	-1.9477-001	2.1779-001
TT25C	-4.4690-001	-2.0320+000	1.7740+000	-1.1725-001	6.3050-002
TT3	-1.4267+000	-3.1671+000	9.1033+000	-1.2736-001	2.1251-001
TT4PHI	-1.2315+000	-1.0048+000	9.2267+000	-1.1508+000	1.7663-001
TT4	-1.6694+000	-2.6350-001	9.3220+000	-2.8462-001	6.8938-002

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HR

	FTIT	PT45	TT25H	TT25C	TT3
FNMX	1.3119-001	-3.0953+000	8.7756+000	-2.2454-001	7.7094-001
WFAN	1.4002+000	9.8248-001	-4.0329+000	5.1497-001	-1.2412-001
TT4	-6.3425-001	-1.5952+000	4.1923+000	3.5598-002	2.7244-002
SMAF	9.8312+000	2.2272+001	-9.1439+001	1.1634+001	-2.8137+000
SMHC	2.659[illegible]+001	1.5673+002	-2.1916+002	3.1401+001	-1.8213+001
DP25QT	[illegible]	[illegible]	-6.2061+000	7.8533-001	-1.8959-001
DP25SC	2.0163-001	1.9519-001	-1.0906+000	1.3573-001	-3.4442-002

D*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	-1.5318-001	-8.4669-002	3.3769-004	4.5925-002	9.6916-001
SNCOM	2.3813-002	5.0589-002	1.4879-003	1.2688-002	1.4124-001
PT7M	4.1068-001	7.6690-001	2.2591-002	1.7436-002	5.3745-001
WFCOM	5.2176-001	9.9197-001	2.8331-002	2.3410-002	6.7997-001
PT3	2.1196-001	4.5062-001	1.4356-002	-4.4759-003	5.5230-002
FTIT	2.6156-001	9.1090-001	3.3964-002	7.3932-002	6.2189-001
PT45	2.8914-001	7.5082-001	2.8167-002	6.9465-002	6.1692-001
TT25H	4.0803-001	1.1470+000	4.3279-002	1.1061-001	8.9448-001
TT25C	6.2327-001	3.5139-001	1.9418-002	7.2371-002	9.3582-002
TT3	2.9605-001	1.6143+000	5.9990-002	1.1897-001	1.0286+000
TT4PHI	8.8304-001	1.6227+000	5.0555-002	2.7110-002	8.9561-001
TT4	3.1165-001	1.6339+000	6.5485-002	1.4433-002	9.1240-001

DR

	WFMBH	ANMIX	CIVV	RCVV	BLC
FNMX	2.3656-001	6.3526-001	-1.6741-003	1.0317-001	1.3089-001
WFAN	-3.3441-001	-6.6421-001	-5.6215-002	-2.7556-002	-6.5124-001
TT4	2.8914-001	7.5082-001	2.8167-002	6.9465-002	6.1692-001
SMAF	-7.5821+000	-1.5056+001	5.0317-001	-6.2535-001	-1.4872+001
SMHC	-2.1140+001	-3.7763+001	-1.2822+000	-3.5041+000	-2.6123+001
DP25QT	-5.0405-001	-1.0200+000	-2.9192-002	-2.9686-002	-1.0921+000
DP25SC	-8.5266-002	-1.7568-001	-8.1267-003	-4.4399-003	-1.9959-001

PROCESSED BY UNIVAC 1100 SERIES FIT PROCESSOR LEVEL W8 AT 3:11:25 PM ON TUESDAY, FEBRUARY 17, 1976 (CREATING CYCLE 0)

```
 1.   F                   REDUCED MATRICES   0/0K  20    FIFTH ORDER
 2.     .5796+00   .1745+01 -.6247+04  .1220+02  .6937+02
 3.    -.1938+01 -.5041+01  .3156+04 -.5014+01  .1123+03
 4.    -.1728-02 -.2176-01 -.2258+00 -.2537-01  .6563+00
 5.     .0000     .0000     .0000    -.1000+02  .0000
 6.     .1654+01  .5349+01 -.2414+04  .6406+01 -.1508+03
 7.   G                   REDUCED MATRICES   0/0K  20    FIFTH ORDER
 8.    -.7251+01 -.5216+04  .9810+01  .1362+02 -.1442+05
 9.     .4376+01  .3172+04 -.1411+02 -.3960+02  .5727+04
10.     .2037-01  .2912+00 -.1606-01 -.2095+00  .3076+02
11.     .1000+02  .0000     .0000     .0000     .0000
12.    -.4050+01 -.2374+04  .1234+02  .5128+02 -.1074+05
13.   HY                  REDUCED MATRICES   0/0K  20    FIFTH ORDER
14.     .3807-01 -.3805+00  .6165+03 -.2254+00  .1186+02
15.     .2649-01  .7874-02 -.1847+02  .3370-01 -.1245+00
16.    -.2655+00 -.2828+00  .4247+03  .5154-01  .6047+00
17.     .2627-03  .2521-03 -.5914+00  .1075-02 -.3987-02
18.     .7124-03  .1778-02 -.1421+01  .2910-02 -.2587-01
19.     .2334-03  .1298-03 -.3893+00  .6972-03 -.2580-02
20.     .5175-04  .2122-04 -.6775-01  .1205-03 -.4688-03
21.   DY                  REDUCED MATRICES   0/0K  20    FIFTH ORDER
22.     .2375+00  .2394+03  .7572-01 -.3843+01  .1480+03
23.    -.2189-01 -.1632+02  .1658+00  .6693-01 -.4801+02
24.     .4186+00  .4081+03 -.1837+01 -.3732+01  .1006+04
25.    -.7008-03 -.5225+00 -.2095-02  .2145-02 -.1548+01
26.    -.1959-02 -.1314+01  .5353-02  .1205-01 -.2727+01
27.    -.4475-03 -.3400+00  .1168-02  .9780-03 -.1092+01
28.    -.7570-04 -.5856-01  .3251-03  .1463-03 -.1996+00
```

CASE 7

```
THE REDUCED MATRICES FR,GR,HR,DR WILL BE SAVED FOR OPTSYS ON FILE 12
INTERMEDIATE DATA WILL BE READ FROM RECORD NO.  3 OF FILE 10

THERE WILL BE 11 EIGENVALUES ELIMINATED. THE TOLERANCE LEVEL FOR ELIMINATION IS      .100
  2 OF THESE EIGENVALUES ARE COMPLEX. TO BE ELIMINATED ARE--
( -.250000+000,  .000000       )
( -.501200+003,  .000000       )
( -.563000+002,  .000000       )
( -.472600+002,  .481000+001)
( -.424800+002,  .000000       )
( -.203300+002,  .417000+001)
( -.220300+002,  .000000       )
( -.161600+002,  .000000       )
( -.196000+001,  .000000       )
( -.710000+000,  .000000       )
( -.191500+002,  .000000       )

THE IDENTIFYING TITLE FOR FR,GR,HP,DR ON OPTSYS OUPUT =REDUCED MATRICES   0/0K  52  FIFTH ORDER
```

F100 LINEAR MODEL 0/0K 52 2/13/76

LAMBDA1

	1	2	3	4	5
1	-1.8098+002	0.0000	0.0000	0.0000	0.0000
2	0.0000	-4.0291+000	3.0626+000	0.0000	0.0000
3	0.0000	-3.0626+000	-4.0291+000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-2.7039+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	-1.0000+001

TI1

	1	2	3	4	5
1	-1.7564-002	-1.5403-001	5.1112-001	5.6259-001	-2.1340-001
2	-4.3418-003	-5.6549-002	4.8092-002	4.0303-001	-1.0644-001
3	-2.4126-002	5.4669-001	7.8897-001	1.0000+000	-2.6655-001
4	0.0000	0.0000	0.0000	0.0000	1.0000+000
5	7.1808-001	-1.8063-001	2.4806-001	7.5649-001	1.8372-001

XI1

	1	2	3	4	5
1	-4.1740+000	-2.9378+000	-7.3442+000	1.5679-001	-3.2875+002
2	-9.1215-001	-7.7838+000	-8.2954-001	5.6068-003	9.9560-001
3	1.1124+000	-1.9082+000	8.6983-002	-3.2790-002	-2.1596+000
4	1.6685+000	-7.9290-001	-7.3502-002	2.7256-002	-2.0151+000
5	1.0000+001	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL 0/OK 52 2/13/76

T21

	1	2	3	4	5
1	1.3256-005	-3.8195-003	1.5421-003	2.0575-002	-1.1436-002
2	1.0000+000	-8.7559-002	3.8291-001	8.3546-001	1.2950-001
3	-7.6057-004	6.7127-002	3.4120-001	3.3699-001	-2.5404-001
4	-2.7229-003	1.7117-001	2.9409-001	2.8765-001	-2.4376-001
5	-2.3231-002	2.2152-002	2.1541-001	3.6947-001	-2.3347-001
6	5.4978-003	2.0878-002	-1.3187-001	-3.3584-001	6.4925-001
7	7.1542-004	-1.0441-002	-7.0087-003	5.0354-002	4.6415-002
8	-1.4096-002	2.7773-002	-1.4729-001	-3.7459-001	5.8052-001
9	-1.3019-002	5.6553-002	-9.5333-002	-3.3444-001	6.1524-001
10	-5.1218-003	-1.3301-002	-3.6531-002	4.3293-001	1.5415-001
11	2.0690-002	2.4295-001	-6.5991-002	-3.8019-001	8.5751-001
12	4.2527-004	2.7573-001	3.1182-001	3.3752-001	-4.8456-001
13	-7.9009-002	3.6837-001	-4.0592-002	-2.9249-002	5.9422-001

T22

	1	2	3	4	5	6	7	8	9	10
1	1.0000+000	8.5519-006	-3.2777-003	-9.7020-004	-6.1446-003	2.6512-003	-6.7297-003	2.0627-003	-1.3779-003	-1.5333-003
2	0.0000	1.0000+000	-1.4997-001	-2.0726-001	-6.0235-002	-7.5908-002	1.1600-001	1.6428-001	4.3126-002	-1.7984-001
3	0.0000	-6.4923-005	1.8990-003	-9.1897-003	3.3742-003	-1.1355-002	5.0281-003	7.9577-003	-1.7149-002	1.2165-001
4	0.0000	-2.6621-004	-1.9098-003	-1.3989-002	-9.7382-003	-9.6693-003	-3.8365-002	-1.0231-001	-1.0455-001	1.9329-001
5	0.0000	-2.2066-004	1.7828-002	5.5652-002	4.1340-002	1.8752-002	5.1336-001	-1.7644-001	1.3357-001	5.0277-002
6	0.0000	-5.4353-005	2.7950-001	7.0273-001	-2.7390-002	1.0000+000	7.2940-001	-3.6715-001	1.7446-001	8.5674-002
7	0.0000	-7.1853-006	3.4366-002	8.5046-002	-4.2061-003	1.1952-001	7.4579-002	-4.2986-002	1.8543-002	8.2281-003
8	0.0000	5.1741-004	-3.9784-002	4.0055-002	6.8363-002	1.6184-001	4.5994-001	-1.5556-001	9.4903-002	5.8581-002
9	0.0000	-2.3269-002	1.0000+000	4.0907-001	1.5477+000	-6.0992-001	6.9249-001	-3.7890-001	1.6404-001	1.3375-001
10	0.0000	-9.2514-003	3.7784-001	1.5720-001	5.7727-001	-2.2582-001	2.2861-001	-1.3773-001	5.5802-002	4.2144-002
11	0.0000	-2.1063-003	1.5772-001	1.1258-001	8.3819-002	-4.8716-003	-8.7252-001	-1.9544+000	-8.0939-001	5.5739-001
12	0.0000	-5.5473-006	7.7618-004	7.6985-003	7.1189-003	8.5412-003	-4.8593-001	1.9709-001	1.0000+000	1.0000+000
13	0.0000	-2.0247-002	-9.0107-001	1.1229+000	-3.2925-001	-1.5348-001	-1.5990+000	-2.0723+000	-4.7761-001	9.9464-001

T22

	11	12	13
1	-1.4213-002	5.3343-002	-4.5926-004
2	-1.1487-001	1.5926-001	-1.2857-001
3	-4.9316-003	4.7219-002	5.4226-002
4	-1.2783-003	2.6950-002	-1.5448-002
5	-5.3024-002	6.2648-002	-2.1249-002
6	1.4043-002	-8.5975-002	2.4233-002
7	-4.3483-003	1.0000+000	2.4760-003
8	1.9005-002	-9.7062-002	1.7791-002
9	2.7249-002	-1.2274-001	4.7504-002
10	1.0000+000	-1.6339-001	1.5665-002
11	1.9230-002	-1.5133-001	1.0000+000
12	-2.6791-003	2.9410-002	-3.7506-001
13	-1.3575-002	-5.8601-002	9.3582-001

F100 LINEAR MODEL 0/0K 52 2/13/76

LAMBDA2

	1	2	3	4	5	6	7	8	9	10
1	-2.5000-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-5.0120+002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-5.6303+001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-4.7263+001	4.8166+000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	-4.8166+000	-4.7263+001	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-4.2482+001	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.0338+001	4.1714+000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.1714+000	-2.0338+001	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-2.2035+001	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-1.6169+001
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LAMBDA2

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-1.9644+000	0.0000	0.0000
12	0.0000	-7.1572-001	0.0000
13	0.0000	0.0000	-1.9156+001

T12

	1	2	3	4	5	6	7	8	9	10
1	0.0000	-5.9945-003	-1.7383-002	3.8444-003	-3.9780-002	2.4997-002	-4.4033-002	1.2485-002	-1.1767-002	1.6828-002
2	0.0000	2.0314-003	-8.9224-003	-2.5838-002	-5.0141-005	-4.0967-002	-5.7435-002	1.8087-002	-1.2962-002	-4.2346-003
3	0.0000	-7.4225-003	4.6838-003	1.6815-002	2.3502-002	-1.9043-003	1.4264-001	2.4423-001	7.3679-002	-1.3112-001
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	3.0183-002	-1.2530-001	-2.2621-001	-1.6749-001	4.7466-003	1.1122-001	3.6043-001	2.9982-002	-3.1311-001

F100 LINEAR MODEL 0/0K 52 2/13/76

T12

	11	12	13
1	-1.3226-002	1.1056-001	9.7485-003
2	-5.8895-002	1.1684-001	1.5829-004
3	-8.5187-002	8.7689-002	-1.1967-001
4	0.0000	0.0000	0.0000
5	-1.5955-001	1.5644-001	-1.9424-001

H1

	1	2	3	4	5
1	7.4877-001	-5.6382-001	5.6456-001	-1.0176-001	1.4360-001
2	1.5026+000	1.0624-001	-8.6347-002	3.5320-002	-1.6562-002
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	7.9803+000	2.2745+000	-1.8513+000	8.6165-001	-3.5535-001
5	6.6147+000	3.1073+001	2.3396+000	-2.0551-001	-7.0037+000

H2

	1	2	3	4	5	6	7	8	9	10
1	0.0000	6.0635-001	4.9374-001	-6.3216-002	-2.7979-002	9.9535-002	2.8779-002	-3.3021-001	2.1031-002	2.1137-002
2	0.0000	-5.0105-003	-9.5586-002	-3.7026-002	-5.4661-003	-5.3311-003	-5.4830-003	-5.7543-003	-5.5505-003	-5.2633-003
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000+000	0.0000	0.0000
4	0.0000	-1.0088-001	-2.0503+000	-7.9359-001	-1.1725-001	-1.1419-001	-1.1808-001	-1.2360-001	-1.1860-001	-1.1298-001
5	0.0000	1.3691-001	-1.6817+001	1.0059+000	1.4939-001	1.4561-001	1.5051-001	1.5774-001	1.5158-001	1.4424-001

H2

	11	12	13
1	3.7251-001	1.6029-001	2.2027-002
2	-5.7882-003	-8.2938-003	-5.4831-003
3	0.0000	0.0000	0.0000
4	-1.2432-001	-1.7739-001	-1.1803-001
5	1.5881-001	2.2621-001	1.5033-001

F100 LINEAR MODEL 0/0K 52 2/13/76

XI2

	1	2	3	4	5
1	5.3609-002	5.5624-003	2.3841-003	-8.0211-004	1.1953-001
2	3.8410+000	1.7747+001	5.9707-001	-5.6938-001	4.6820+002
3	2.6991+001	7.8089+000	-5.4561+000	-2.8062-001	-1.0581+002
4	1.3635+001	5.6388+000	-2.6385+000	-1.5240-001	-6.7859+001
5	-3.6573+001	-1.0319+001	5.4334+000	3.8954-001	1.2923+002
6	-2.6292+001	-7.8597+000	3.4121+000	2.9189-001	8.9797+001
7	6.8342+000	3.7864+000	-3.1525-001	-8.8484-002	-9.8605+000
8	7.6643+000	4.1855+000	-7.4680-001	5.2408-002	6.5784+000
9	-3.8138+000	-7.1098+000	9.4211-001	-4.6697-002	-1.1140+001
10	1.0732+001	1.1254+001	-6.0041-001	-3.7264-003	8.8504+000
11	-9.7811-002	2.8219-001	3.9710-002	-1.7314-002	1.6911+000
12	1.5581-001	1.6405-002	6.7598-003	-2.6683-003	3.6635-001
13	1.5067+000	3.0677-002	4.0475-001	2.0068-002	9.6506+000

T11 INVERSE

	1	2	3	4	5
1	-6.0977-001	-1.9210+000	8.1761-002	-5.6427-001	1.3688+000
2	-1.8817+000	-4.6008-001	1.2492+000	-1.1628-001	-6.8360-003
3	1.9183+000	-3.2716+000	2.1339-001	1.1170-001	3.4309-002
4	-4.9948-001	2.7864+000	1.5069-001	2.2837-001	9.6931-003
5	0.0000	0.0000	0.0000	1.0000+000	0.0000

FP

	SNFAN	SNCOM	PT7M	WFCOM	PT3
SNFAN	-4.2361+000	-1.6297+000	-1.6896+000	-1.8004-001	4.2561+000
SNCOM	-7.9033-001	-3.3824+000	-7.7641-002	3.2176-001	1.0519+000
PT7M	4.4931+000	-6.8745+000	-6.1415+000	-4.6859-002	5.9307+000
WFCOM	0.0000	0.0000	0.0000	-1.0000+001	0.0000
PT3	7.7350+001	2.4905+002	-1.1305+001	7.0859+001	-1.7797+002

F100 LINEAR MODEL 0/0K 52 2/13/76

UNNORMALIZED EIGENSYSTEM.

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.80984+002)+J(0.00000)	0.00000	1.00000	1	(-9.04893-001)+J(0.00000)	-.9048926	.00000
			2	(-2.96487-001)+J(0.00000)	-.2964869	.00000
			3	(-3.92242-003)+J(0.00000)	-.0039224	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-4.02906+000)+J(3.06256+000)	5.06089+000	.79612	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(1.54843-001)+J(9.99823-002)	.1843168	32.85044
			3	(3.53315-003)+J(-4.43996-003)	.0056742	-51.48857
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(1.46654-002)+J(5.13314-003)	.0155378	19.29098
(-2.70386+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(9.49536-001)+J(0.00000)	.9495362	.00000
			3	(5.60922-003)+J(0.00000)	.0056092	.00000
			4	(0.00000)+J(0.00000)	.0000000	.00000
			5	(3.63472-002)+J(0.00000)	.0363472	.00000
(-1.00000+001)+J(0.00000)	0.00000	1.00000	1	(-3.67535-001)+J(0.00000)	-.3675351	.00000
			2	(-2.42985-001)+J(0.00000)	-.2429850	.00000
			3	(-1.44872-003)+J(0.00000)	-.0014487	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(8.55311-003)+J(0.00000)	.0085531	.00000

LAMBDA2 INVERSE

		2	3	4	5	6	7	8	9	10
1	-4.0000+000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	-1.9952-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-1.7761-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	-2.0940-002	-2.1341-003	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	2.1341-003	-2.0940-002	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	-2.3539-002	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.7184-002	-9.6778-003	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	9.6778-003	-4.7184-002	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-4.5382-002	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-6.1846-002
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

F100 LINEAR MODEL 0/0K 52 2/13/76

LAMBDA2 INVERSE

	11	12	13
1	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000
11	-5.0853-001	0.0000	0.0000
12	0.0000	-1.3972+000	0.0000
13	0.0000	0.0000	-5.2202-002

GR

	WFMBH	ANMTX	CTVV	RCVV	BLC
SNFAN	-1.2392-001	4.6861-001	2.6571-001	-9.2303-003	4.1756+000
SNCOM	-1.3867-001	1.8557-001	5.3437-002	7.8178-003	6.9730-001
PT7M	-1.7379-001	-5.9914+000	-2.9065-001	-8.6536-005	4.8896+000
WFCOM	1.0000+001	0.0000	0.0000	0.0000	0.0000
PT3	-1.0357+001	-3.0300+001	-5.6915+000	2.9656-001	-2.7785+002

H*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	-1.3975-004	5.4016-002	-1.3406-003	-6.1284-003	2.9660-004
SNCOM	-1.2780-001	-8.0551-001	1.7999-001	-1.9102-001	1.3906+000
FT7M	3.6034-001	-2.0670-001	2.0738-001	-1.4634-001	1.3473-002
WFCOM	1.0004-001	-2.3415-001	3.1971-001	-1.6358-001	7.9809-003
PT3	2.0115-001	3.5919-001	1.2742-001	-1.1449-001	-2.0978-002
FTIT	-1.2784-001	-5.2452-001	-5.2217-002	5.5230-001	-3.9667-004
PT45	-1.9384-002	1.6666-001	-6.8925-003	5.7940-002	1.2983-003
TT25H	-1.3911-001	-5.4755-001	-5.4337-002	4.8324-001	-2.8169-002
TT25C	-1.1430-001	-6.2099-001	-1.1591-003	5.2899-001	-2.4719-002
TT3	-2.5816-001	1.3418+000	4.0409-002	2.5338-001	-3.9768-003
TT4PHI	-4.0646-001	-9.9498-001	2.3382-001	7.2339-001	2.0710-002
TT4PLO	-8.9528-002	-2.0737-001	4.6188-001	-4.0495-001	1.2667-002
TT4	-7.0823-001	3.3594-002	4.4064-001	5.8476-001	-1.1234-001

F100 LINEAR MODEL 0/0K 52 2/13/76

HP

	FTIT	PT45	TT25H	TT25C	TT3
FNMX	6.8067-001	-1.4040+000	9.3664-001	-1.4530-001	1.0095+000
WFAN	1.4746+000	1.4546-001	-1.2678-001	4.2601-002	-2.4292-002
TT4	-1.3911-001	-5.4755-001	-5.4337-002	4.8324-001	-2.8169-002
SMAF	7.3791+000	3.1146+000	-2.7183+000	1.0172+000	-5.2029-001
SMHC	3.7872-001	3.4019+001	-5.8639-001	2.4409+000	-7.0544+000

D*

	FNMX	WFAN	TT4	SMAF	SMHC
SNFAN	2.2399-001	2.0563-002	9.7166-003	-3.2737-003	4.9132-001
SNCOM	2.2376-002	1.5627-001	1.4877-002	-2.1441-003	1.2296+000
PT7M	9.3251-002	1.0194-001	-3.2635-003	-1.4164-004	1.2829-001
WFCOM	1.0652-001	1.6247-001	-7.3024-003	-3.7141-004	1.4722-001
PT3	1.3159-001	7.0390-002	6.2433-004	-2.3902-003	-2.8157-001
FTIT	-1.0819-001	2.7522-002	1.8304-002	-3.5777-004	2.0514-001
PT45	1.9720-001	2.5370-002	1.1825-002	-3.7656-003	5.3521-001
TT25H	-6.6214-003	2.7392-002	1.8727-002	-2.5486-004	2.7602-001
TT25C	-7.1835-002	6.0758-002	1.9469-002	-7.5847-004	3.0112-001
TT3	-1.4961-001	1.7512-001	2.7928-002	-8.8322-003	9.1129-001
TT4PHI	-3.0104-001	1.7026-001	3.6226-002	-6.6679-004	5.7524-001
TT4PLO	3.1648-001	3.2354-001	5.4910-003	-5.5239-004	2.3584-001
TT4	-2.7534-001	2.6609-001	5.1400-002	-1.1562-003	2.1307-001

DR

	WFMBH	ANMTX	CIVV	PCVV	BLC
FNMX	-2.5668-002	1.6828-001	-4.3764-002	-2.0306-003	1.1851+000
WFAN	-1.2432-002	-4.3152-002	-1.0217-001	2.4537-004	-7.5293-002
TT4	-6.6214-003	2.7392-002	1.8727-002	-2.5486-004	2.7602-001
SMAF	-2.6639-001	-3.9439-001	-3.2477-002	5.5840-003	-1.6926+000
SMHC	-1.4730+000	-1.2448+000	-2.5980-001	1.3369-001	-2.0986+000

```
PROCESSED BY UNIVAC 1100 SERIES FIT PROCESSOR LEVEL W8 AT 9:43:42 AM ON TUESDAY, FEBRUARY 17, 1976  (CREATING CYCLE 0)

 1.   F                         REDUCED MATRICES   0/0K  52  FIFTH ORDER
 2.    -.4256+01 -.1230+01 -.5354+03 -.3101+00  .1575+03
 3.    -.1048+01 -.3382+01 -.3261+02  .7345+00  .5158+02
 4.     .1418-01 -.2113-01 -.6141+01 -.2547-03  .6924+00
 5.     .0000     .0000     .0000    -.1000+02  .0000
 6.     .2091+01  .5079+01 -.9684+02  .3299+01 -.1780+03
 7.   G                         REDUCED MATRICES   0/0K  52  FIFTH ORDER
 8.    -.2134+00  .1368+04 -.9307+02  .3127+02  .3656+05
 9.    -.3166+00  .7179+03 -.2481+02 -.3510+02  .8093+04
10.    -.9446-03 -.5519+02  .3213+00  .9251-03  .1351+03
11.     .1000+02  .0000     .0000     .0000     .0000
12.    -.4822+00 -.2391+04  .5389+02 -.2716+02 -.6576+05
13.   HY                        REDUCED MATRICES   0/0K  52  FIFTH ORDER
14.     .6121+00 -.9525+00  .2669+03 -.2250+00  .3358+02
15.     .3037-01  .2260-02 -.8275+00  .1511-02 -.1851-01
16.    -.3804-01 -.1129+00 -.4708+01  .2276+00 -.2849+00
17.     .1864-03  .5936-04 -.2176-01  .4426-04 -.4862-03
18.     .6493-05  .4400-03 -.3186-02  .7207-04 -.4474-02
19.   DY                        REDUCED MATRICES   0/0K  52  FIFTH ORDER
20.    -.3975-01  .4417+03  .1378+02  .6186+01  .9332+04
21.    -.4410-03 -.2594+01  .7371+00 -.1712-01 -.1358+02
22.    -.3118-02  .2186+02 -.1793+01  .2361+00  .6608+03
23.    -.1159-04 -.2834-01  .2874-03 -.4779-03 -.3744+00
24.    -.4349-04 -.6229-01  .1560-02 -.7764-02 -.3150+00
```

D.4 EXAMPLE OF TRANSFER FUNCTION DATA ON 16TH ORDER LINEAR MODEL

PLA = 52°
ALTITUDE = 0
MACH NUMBER = 0

ELEMENT	UNITS	VARIABLE	SYMBOL
Y(1)	rpm	Fan Speed	N_1
Y(2)	rpm	Compressor Speed	N_2
Y(3)	psia	Compressor Discharge Pressure	P_{T3}
Y(4)	psia	Interturbine Pressure	$P_{T4.5}$
Y(5)	psia	Augmentor Pressure	P_{T7M}
Y(6)	°R	Fan Inside Temperature	$T_{T2.5H}$
Y(7)	°R	Duct Temperature	$T_{T2.5C}$
Y(8)	°R	Compressor Discharge Temperature	T_{T3}
Y(9)	°R	Burner Exit Fast Temperature	T_{T4HI}
Y(10)	°R	Burner Exit Slow Temperature	T_{T4LO}
Y(11)	°R	Burner Exit Total Temperature	T_{T4}
Y(12)	°R	Fan Inlet Fast Temperature	T_{T45HI}
Y(13)	°R	Fan Inlet Slow Temperature	T_{T45LO}
Y(14)	°R	Fan Turbine Exit Temperature	T_{T5}
Y(15)	°R	Duct Exit Temperature	T_{T6C}
Y(16)	°R	Augmentor Temperature	T_{T7M}
U(1)	lbm/hr	Fuel Flow	WFMB
U(2)	ft^2	Nozzle Area	A_J
U(3)	deg	CIVV	CIVV

```
+-----------------------------------+
!  ZEROES OF THE TRANSFER FUNCTION  !
+-----------------------------------+
```

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(1) AND U(1) =

1	(-2.48938+003)	+	J(0.00000)
2	(9.08615+001)	+	J(0.00000)
3	(-8.00141+001)	+	J(2.56164+001)
4	(-8.00141+001)	+	J(-2.56164+001)
5	(-4.93629+001)	+	J(0.00000)
6	(-3.78744+001)	+	J(0.00000)
7	(-2.36457+001)	+	J(0.00000)
8	(-2.04135+001)	+	J(0.00000)
9	(-1.86399+001)	+	J(1.47440+000)
10	(-1.86399+001)	+	J(-1.47440+000)
11	(-1.79657+001)	+	J(0.00000)
12	(-3.63711+000)	+	J(2.38516+000)
13	(-3.63711+000)	+	J(-2.38516+000)
14	(-1.96753+000)	+	J(0.00000)
15	(-7.56534-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

7.60579+019	1.92190+020	1.64404+020	6.81682+019	1.61763+019	2.32134+018	2.10085+017	1.22824+016
4.63352+014	1.08092+013	1.33942+011	2.16460+008	-1.66321+007	-2.04068+005	-8.22113+002	-2.98400-001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.94792+000		
-5.63031+001	3.72926+000		
-1.80984+002	-2.15896+000		
(-4.72635+001) + J(4.81644+000)	(-4.67030+000) + J(1.91455+000)	1.00950+001	-157.70925
-4.24820+001	3.67675+000		
(-2.03379+001) + J(4.17142+000)	(3.08330-002) + J(-4.50140-001)	9.02390-001	86.08156
-2.20350+001	-9.30195-002		
-1.91564+001	-2.31655-002		
-1.61691+001	-1.91896-001		
(-4.02906+000) + J(3.06256+000)	(4.42362-001) + J(3.53724-002)	8.87548-001	-4.57179
-2.70386+000	1.17958+000		
-1.96643+000	1.78991-003		
-7.15716-001	2.75474-002		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(2) AND U(1) =

1	(-3.23279+002) + J(0.00000)
2	(-8.84620+001) + J(7.16855+001)
3	(-8.84620+001) + J(-7.16855+001)
4	(3.34945+001) + J(0.00000)
5	(-5.10497+001) + J(0.00000)
6	(-4.81776+001) + J(0.00000)
7	(-2.35225+001) + J(0.00000)
8	(-1.91262+001) + J(0.00000)
9	(-2.04385+001) + J(0.00000)
10	(-1.86927+001) + J(0.00000)
11	(-1.55655+001) + J(0.00000)
12	(-3.84038+000) + J(2.98891+000)
13	(-3.84038+000) + J(-2.98891+000)
14	(-1.97380+000) + J(0.00000)
15	(-7.87999-001) + J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

5.85894+019	1.39953+020	1.11388+020	4.22207+019	9.13477+018	1.17544+018	9.09957+016	4.06894+015
8.15312+013	-1.07688+012	-1.07258+011	-2.80515+009	-3.81523+007	-2.89320+005	-1.16015+003	-1.72200+000

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-8.74958-001		
-5.63031+001	2.53714+000		
-1.80984+002	-7.07381-001		
(-4.72635+001) + J(4.81644+000)	(2.01051+000) + J(3.82955+000)	8.65046+000	-62.30050
-4.24820+001	-7.98694+000		
(-2.03379+001) + J(4.17142+000)	(3.11443-002) + J(-7.86187-001)	1.57361+000	87.73145
-2.20350+001	-1.35814-001		
-1.91544+001	-4.97977-004		
-1.61691+001	6.40049-002		
(-4.02906+000) + J(3.06256+000)	(6.49599-002) + J(4.97055-002)	1.63590-001	-37.42222
-2.70385+000	1.12006+000		
-1.94603+000	1.05647-002		
-7.15716-001	3.85863-002		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(3) AND U(1) =

1	(-5.35810+002) + J(0.00000)	
2	(-8.46649+001) + J(0.00000)	
3	(-5.17977+001) + J(0.00000)	
4	(-4.23580+001) + J(0.00000)	
5	(-3.19797+001) + J(0.00000)	
6	(-2.25957+001) + J(0.00000)	
7	(-2.10791+001) + J(0.00000)	
8	(-1.88282+001) + J(0.00000)	
9	(-1.46286+001) + J(7.80849+000)	
10	(-1.46286+001) + J(-7.80849+000)	
11	(-6.69885+000) + J(0.00000)	
12	(-4.01924+000) + J(2.62856+000)	
13	(-4.01924+000) + J(-2.62856+000)	
14	(-1.97454+000) + J(0.00000)	
15	(-7.44226-001) + J(0.00000)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

4.53865+018	1.21954+019	1.15461+019	5.54200+018	1.59220+018	2.95538+017	3.69706+016	3.20318+015
1.95160+014	8.38883+012	2.52037+011	5.16468+009	6.89009+007	5.48872+005	2.17979+003	2.54700+000

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-2.65119-001		
-5.63031+001	7.26587-001		
-1.80984+002	2.38588+000		
(-4.73635+001) + J(4.81644+000)	(-1.45458-001) + J(9.49809-001)	1.92177+000	-98.70688
-4.20820+001	1.88723-002		
(-2.03379+001) + J(4.17142+000)	(-1.00410-001) + J(-4.55855-003)	2.01027-001	177.40058
-2.20350+001	6.40434-003		
-1.91564+001	1.24764-002		
-1.61691+001	9.65140-002		
(-4.02906+000) + J(3.04256+000)	(6.30583-003) + J(2.78946-003)	1.37905-002	-23.86276
-2.76386+000	4.28745-002		
-1.96643+000	5.83651-004		
-7.15716-001	1.05359-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(4) AND U(1) =

1	(1.80807+002)	+ J(0.00000	)
2	(-1.03896+002)	+ J(0.00000	)
3	(-5.11841+001)	+ J(0.00000	)
4	(-4.07792+001)	+ J(0.00000	)
5	(-3.22304+001)	+ J(0.00000	)
6	(-2.32604+001)	+ J(0.00000	)
7	(-1.66407+001)	+ J(6.28969+000)	
8	(-1.66407+001)	+ J(-6.28969+000)	
9	(-2.09665+001)	+ J(0.00000	)
10	(-1.97836+001)	+ J(0.00000	)
11	(-7.36075+000)	+ J(0.00000	)
12	(-4.14390+000)	+ J(2.55444+000)	
13	(-4.14390+000)	+ J(-2.55444+000)	
14	(-1.97180+000)	+ J(0.00000	)
15	(-7.43287-001)	+ J(0.00000	)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.22094+018	3.26349+018	3.03827+018	1.42141+018	3.94800+017	7.02345+016	8.34040+015	6.77881+014
3.81024+013	1.48067+012	3.87533+010	6.45994+008	5.92203+006	1.39951+004	-1.97635+002	-1.19100+000

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION		RESIDUE AT THE POLE		COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002		-2.29383+000			
-5.63031+001		2.27106-001			
-1.80984+002		8.67682-001			
(-4.72635-001	+ J(4.81644+000)	(3.87122-002)	+ J(1.88493-001)	3.84855-001	-78.39413
-4.24820+001		-7.88158-002			
(-2.03379+001	+ J(4.17142+000)	(-1.34871-002)	+ J(3.73511-003)	2.79895-002	-164.52047
-2.20350+001		2.40512-003			
-1.91544+001		2.15826-003			
-1.61691+001		1.44763-002			
(-4.02906+000	+ J(3.06256+000)	2.30483-003)	+ J(2.74337-005)	4.60998-003	-.68194
-2.70396+000		1.23455-002			
-1.96643+000		1.09741-004			
-7.15716-001		2.80107-004			

F 100 ENGINE TRANSFER FUNCTIONS

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(5) AND U(1) =

1	(-1.22822+002)	+ J(3.31241+002)
2	(-1.22822+002)	+ J(-3.31241+002)
3	(-6.96817+001)	+ J(0.00000)
4	(-5.28044+001)	+ J(0.00000)
5	(-4.21866+001)	+ J(0.00000)
6	(-2.52361+001)	+ J(2.13366+001)
7	(-2.52361+001)	+ J(-2.13366+001)
8	(-2.41969+001)	+ J(0.00000)
9	(-2.09931+001)	+ J(0.00000)
10	(-1.41174+001)	+ J(0.00000)
11	(-1.88924+001)	+ J(0.00000)
12	(-4.26624+000)	+ J(2.17951+000)
13	(-4.26624+000)	+ J(-2.17951+000)
14	(-1.97007+000)	+ J(0.00000)
15	(-7.32076-001)	+ J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

4.58386+017	1.17470+018	1.00419+018	4.11177+017	9.58087+016	1.37025+016	1.27062+015	7.94249+013
3.42573+012	1.02722+011	2.11856+009	2.90390+007	2.47130+005	1.16069+003	2.65758+000	4.83000-003

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01261+002	7.61126-003		
-5.63031+001	-3.17095-003		
-1.80984+002	-9.35841-003		
(-4.75635+001) + J(4.81644+000)	(5.15819-003) + J(-1.02976-002)	2.30345-002	63.39317
-4.20820+001	-8.83916-004		
(-2.03379+001) + J(4.17142+000)	(-8.65010-003) + J(1.60905-003)	1.75970-002	-169.46257
-2.20350+001	1.83803-003		
-1.91544+001	8.97365-004		
-1.51691+001	4.71860-003		
(-4.02906+000) + J(3.06256+000)	(1.71999-003) + J(-1.83910-003)	5.03612-003	46.91678
-2.70386+000	6.61654-003		
-1.96643+000	3.63809-005		
-7.15716-001	6.89461-005		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(6) AND U(1) =

1	(-5.11774+002)	+	J(0.00000)
2	(-1.65341+002)	+	J(0.00000)
3	(-6.05947+001)	+	J(8.45758+000)
4	(-6.05947+001)	+	J(-8.45758+000)
5	(-4.72186+001)	+	J(0.00000)
6	(1.81853+001)	+	J(0.00000)
7	(-3.11605+001)	+	J(0.00000)
8	(-2.02983+001)	+	J(3.79661+000)
9	(-2.02983+001)	+	J(-3.79661+000)
10	(-2.14249+001)	+	J(0.00000)
11	(-1.87972+001)	+	J(0.00000)
12	(-3.78417+000)	+	J(2.31683+000)
13	(-3.78417+000)	+	J(-2.31683+000)
14	(-1.96714+000)	+	J(0.00000)
15	(-7.48561-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

2.93430+018	7.22543+018	5.80955+018	2.16078+018	4.32874+017	4.67030+016	2.46531+015	1.22691+013
-6.53321+012	-4.31207+011	-1.41786+010	-2.75134+008	-3.19122+006	-2.08665+004	-6.60353+001	-6.95400-002

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.63722-003		
-5.63031+001	-3.16160-002		
-1.80984+002	-7.25510-003		
(-4.72635+001) + J(4.81644+000)	7.12739-002) + J(6.42372-002)	1.91900-001	-42.02745
-4.24820+001	-1.29615-001		
(-2.03379+001) + J(4.17142+000)	-7.02963-003) + J(1.56335-003)	1.44027-002	-167.46181
-2.20350+001	-1.05209-002		
-1.91544+001	-9.99034-003		
-1.61691+001	-1.07658-001		
(-4.02906+000) + J(3.04256+000)	2.06000-002) + J(-8.88386-003)	4.48680-002	23.32832
-2.70386+000	5.48338-002		
-1.96643+000	5.17053-005		
-7.15716-001	9.13014-004		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(7) AND U(1) =

1	(-5.24345+002) + J(0.00000)	
2	(-1.51312+002) + J(0.00000)	
3	(-6.91528+001) + J(0.00000)	
4	(-5.35495+001) + J(0.00000)	
5	(-2.59887+001) + J(0.00000)	
6	(-4.45543+001) + J(0.00000)	
7	(-1.91897+001) + J(8.22057+000)	
8	(-1.91897+001) + J(-8.22057+000)	
9	(-2.00444+001) + J(0.00000)	
10	(-1.92487+001) + J(0.00000)	
11	(1.16437+001) + J(0.00000)	
12	(-3.96736+000) + J(2.18536+000)	
13	(-3.96736+000) + J(-2.18536+000)	
14	(-1.96664+000) + J(0.00000)	
15	(-7.37413-001) + J(0.00000)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

2.45559+018	6.03567+018	4.75581+018	1.68457+018	3.04585+017	2.53507+016	1.38567+014	-1.63562+014
-1.60743+013	-8.00400+011	-2.44553+010	-4.65974+008	-5.44031+006	-3.62064+004	-1.17159+002	-1.23900-001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	6.69854-003		
-5.63031+001	3.17260-002		
-1.80984+002	-2.59165-002		
(-4.72635+001) + J(4.81644+000)	(-2.04092-002) + J(1.65436-001)	3.33380-001	-97.03283
-4.20820+001	-1.10132-001		
(-2.03379+001) + J(4.17142+000)	(8.33072-002) + J(-1.17503-003)	1.66811-001	.80722
-2.20350+001	-6.40005-002		
-1.91564+001	2.84239-003		
-1.61691+001	-1.70682-001		
(-4.02906+000) + J(3.06256+000)	(1.61756-002) + J(-1.47699-002)	4.38086-002	42.39920
-2.70386+000	4.67029-002		
-1.96603+000	1.33060-005		
-7.15716-001	5.19058-004		

```
ZEROES OF THE TRANSFER FUNCTION BETWEEN Y( 8) AND U( 1) =

      1    (-1.49193+003) + J( 0.00000     )
      2    (-8.38607+001) + J( 0.00000     )
      3    (-5.34252+002) + J( 0.00000     )
      4    (-5.24742+001) + J( 0.00000     )
      5    (-4.37601+001) + J( 0.00000     )
      6    (-2.15344+001) + J( 0.00000     )
      7    (-3.05243+001) + J( 0.00000     )
      8    (-1.91266+001) + J( 0.00000     )
      9    (-1.66633+001) + J( 0.00000     )
     10    (-6.56263+000) + J( 9.82086+000)
     11    (-6.56263+000) + J(-9.82086+000)
     12    (-3.87586+000) + J( 2.48974+000)
     13    (-3.87586+000) + J(-2.48974+000)
     14    (-1.97304+000) + J( 0.00000     )
     15    (-7.50512-001) + J( 0.00000     )

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

     7.33674+018    1.86676+019    1.61571+019    6.88311+018    1.73290+018    2.79167+017    3.05460+016    2.33314+015
     1.24462+014    4.56200+012    1.11598+011    1.73962+009    1.59683+007    7.40197+004    1.20522+002    5.20000-002

RESIDUES OF THE TRANSFER FUNCTION=

          POLE LOCATION                          RESIDUE AT THE POLE           COMBINED RESIDUES=MAG*COS(WD*T+PHI)
                                                                                  MAGNITUDE             PHI(DEG)

     -5.07201+002                              1.08304-002
     -5.63031+001                             -5.57493-001
     -1.80984+002                             -4.16225-001
    (-4.72635+001) + J( 4.81644+000)          ( 1.95138-001) + J(-1.26124+000)     2.55250+000          81.20500
     -4.24820+001                              4.02055-001
    (-2.03379+001) + J( 4.17142+000)          (-1.06392-002) + J( 7.79949-001)     1.56004+000         -90.78151
     -2.20350+001                              1.53914-001
     -1.91564+001                              7.35939-003
     -1.61691+001                             -8.35703-002
    (-4.02906+000) + J( 3.06256+000)          ( 2.49455-002) + J(-8.13884-003)     5.24792-002          18.06970
     -2.70386+000                              1.12920-001
     -1.96643+000                              1.04599-003
     -7.15716-001                              2.27521-003
```

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(9) AND U(1) =

```
 1   (-7.79989+003) + J( 0.00000      )
 2   (-5.03347+002) + J( 0.00000      )
 3   (-1.87575+002) + J( 0.00000      )
 4   (-5.10488+001) + J( 0.00000      )
 5   (-4.80129+001) + J( 0.00000      )
 6   (-2.33807+001) + J( 0.00000      )
 7   (-1.96702+001) + J( 0.00000      )
 8   (-2.00822+001) + J( 0.00000      )
 9   (-1.87302+001) + J( 0.00000      )
10   (-1.51052+001) + J( 0.00000      )
11   (-3.92061+000) + J( 3.04118+000)
12   (-3.92061+000) + J(-3.04118+000)
13   (-1.98040+000) + J( 0.00000      )
14   (-6.66627-001) + J( 0.00000      )
15   (-1.84449+000) + J( 0.00000      )
```

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

```
1.57271+019   4.90579+019   5.70586+019   3.23936+019   1.04868+019   2.10593+018   2.70133+017   2.25635+016
1.24616+015   4.44940+013   1.03239+012   1.45321+010   1.13194+008   4.04412+005   4.83848+002   5.56200-002
```

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	4.15559-003		
-5.63031+001	-1.41082+001		
-1.80984+002	1.59001-001		
(-4.72635+001) + J(4.81644+000)	(-1.04624+001) + J(-1.80903+001)	4.17957+001	120.04274
-4.20820+001	3.46080+001		
(-2.03379+001) + J(3.17102+000)	(2.29842-001) + J(1.88004+000)	3.78807+000	-83.02995
-2.20350+001	3.24092-001		
-1.91544+001	-1.35094-002		
-1.61691+001	-2.29870-001		
(-4.02905+000) + J(3.06256+000)	(-2.60727-002) + J(1.45837-003)	5.22268-002	-176.79849
-2.70385+000	-1.65677-001		
-1.96643+000	-4.47160-004		
-7.15716-001	-5.04008-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(10) AND U(1) =

1	(-7.79782+003)	+ J(0.00000)
2	(-5.03347+002)	+ J(0.00000)
3	(-1.87575+002)	+ J(0.00000)
4	(-5.10486+001)	+ J(0.00000)
5	(-4.60124+001)	+ J(0.00000)
6	(-2.33806+001)	+ J(0.00000)
7	(-2.00834+001)	+ J(0.00000)
8	(-1.96693+001)	+ J(0.00000)
9	(-1.51057+001)	+ J(0.00000)
10	(-1.87297+001)	+ J(0.00000)
11	(-3.92053+000)	+ J(3.04131+000)
12	(-3.92053+000)	+ J(-3.04131+000)
13	(-4.99508+000)	+ J(0.00000)
14	(-1.98041+000)	+ J(0.00000)
15	(-1.84499+000)	+ J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.74455+018	3.27751+018	2.53011+018	1.06985+018	2.79518+017	4.75963+016	5.39749+015	4.11938+014
2.11957+013	7.27739+011	1.62217+010	2.22530+008	1.70284+006	6.02225+003	7.17173+000	8.24200-004

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	6.10397-005		
-5.63031+001	-1.92739-001		
-1.80984+002	2.29896-003		
(-4.72635+001) + J(4.81644+000)	(-1.43290-001) + J(-2.41886-001)	5.62284-001	120.64201
-4.24820+001	4.59608-001		
(-2.03379+001) + J(4.17142+000)	(3.93210-003) + J(2.18331-002)	4.43687-002	-79.79057
-2.20350+001	3.83226-003		
-1.91564+001	-1.53809-004		
-1.61691+001	-2.45293-003		
(-4.02906+000) + J(3.04256+000)	(-1.00931-004) + J(2.53979-004)	5.46598-004	-111.67288
-2.70386+000	2.76007-003		
-1.96643+000	1.53844-005		
-7.15716-001	6.51362-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(11) AND U(1) =

```
 1   (-5.03158+002) + J( 0.00000      )
 2   (-1.86814+002) + J( 0.00000      )
 3   (-5.14569+001) + J( 0.00000      )
 4   (-4.86810+001) + J( 1.01593+000)
 5   (-4.86810+001) + J(-1.01593+000)
 6   (-2.31877+001) + J( 0.00000      )
 7   (-1.98529+001) + J( 7.05108-001)
 8   (-1.98529+001) + J(-7.05108-001)
 9   (-1.89022+001) + J( 0.00000      )
10   (-1.52356+001) + J( 0.00000      )
11   (-3.90988+000) + J( 3.03241+000)
12   (-3.90988+000) + J(-3.03241+000)
13   (-1.97759+000) + J( 0.00000      )
14   (-1.75708+000) + J( 0.00000      )
15   (-6.59325-001) + J( 0.00000      )
```

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

```
1.85536+019   6.00720+019   7.02369+019   4.09576+019   1.36857+019   2.85857+018   3.86475+017   3.46628+016
2.09773+015   8.61961+013   2.38790+012   4.35532+010   4.98510+008   3.27171+006   1.03148+004   1.08800+001
```

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-4.59495-002		
-5.63031+001	2.33358+000		
-1.60984+002	-4.73719-001		
(-4.72635+001) + J(4.81664+000)	(1.44265+000) + J(-2.32473+000)	5.47196+000	58.17767
-4.24820+001	6.50862+000		
(-2.03379+001) + J(4.17142+000)	(-[illegible].42766-002) + J(1.30844+000)	2.61733+000	-91.06293
-2.20350+001	2.05120-001		
-1.91564+001	-1.15575-002		
-1.61691+001	-1.82646-001		
(-4.03906+000) + J(3.06256+000)	(-3.40563-002) + J(9.03906-004)	6.81366-002	-178.47963
-2.70386+000	-2.14738-001		
-1.94603+000	-7.03207-004		
-7.15716-001	-6.61205-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(12) AND U(1) =

1	(2.08295+002)	+	J(1.66683+003)
2	(2.08295+002)	+	J(-1.66683+003)
3	(-1.74635+002)	+	J(0.00000)
4	(-4.97093+001)	+	J(0.00000)
5	(-2.36774+001)	+	J(0.00000)
6	(-3.95559+001)	+	J(0.00000)
7	(-2.00730+001)	+	J(1.67835-001)
8	(-2.00730+001)	+	J(-1.67835-001)
9	(-1.46339+001)	+	J(0.00000)
10	(-1.87304+001)	+	J(0.00000)
11	(-3.94035+000)	+	J(3.07849+000)
12	(-3.94035+000)	+	J(-3.07849+000)
13	(-1.99904+000)	+	J(0.00000)
14	(-1.87094+000)	+	J(0.00000)
15	(-5.51328-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.22738+019	3.92742+019	4.48673+019	2.54465+019	8.23779+018	1.65717+018	2.13462+017	1.79385+016
9.92427+014	3.59624+013	8.29612+011	1.14479+010	8.24047+007	2.16133+005	-3.42773+000	7.95300-002

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.07201+002	1.32400+000		
-5.63031+001	-3.75659+001		
-1.80984+002	-2.80211-001		
(-4.72635+001) + J(4.81644+000)	(2.60534+001) + J(-2.39707+001)	7.08060+001	42.61597
-4.27620+001	-1.57093+001		
(-2.03379+001) + J(4.17102+000)	(2.11469-001) + J(1.34607+000)	2.72522+000	-81.06344
-2.20350+001	2.27072-001		
-1.91544+001	-1.97666-002		
-1.61691+001	-2.67067-001		
(-4.02906+000) + J(3.06256+000)	(-1.53034-002) + J(-5.11412-003)	3.22706-002	161.52128
-2.70386+000	-1.22788-001		
-1.96643+000	-6.45735-004		
-7.15715-001	-5.35482-003		

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TRANSFER FUNCTION PROGRAM

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(13) AND U(1) =

1	(2.11348+002)	+	J(1.66987+003)
2	(2.11348+002)	+	J(-1.66987+003)
3	(-1.74632+002)	+	J(0.00000)
4	(-4.97093+001)	+	J(0.00000)
5	(-3.73565+001)	+	J(0.00000)
6	(-2.36749+001)	+	J(0.00000)
7	(-2.00726+001)	+	J(1.67975-001)
8	(-2.00726+001)	+	J(-1.67975-001)
9	(-1.87305+001)	+	J(0.00000)
10	(-1.46355+001)	+	J(0.00000)
11	(-3.94003+000)	+	J(3.07894+000)
12	(-3.94003+000)	+	J(-3.07894+000)
13	(-4.98748+000)	+	J(0.00000)
14	(-1.87175+000)	+	J(0.00000)
15	(-6.51372-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.36134+018	3.94744+018	3.87366+018	1.88099+018	5.37957+017	9.77017+016	1.16204+016	9.19637+014
4.86591+013	1.70481+012	3.83611+010	5.19406+008	3.68874+006	9.59491+003	-1.62645-001	3.51900-003

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	5.84897-002		
-5.63031+001	-1.57708+000		
-1.80984+002	-1.22488-002		
(-4.72635+001) + J(4.81644+000)	(1.07442+000) + J(-1.00346+000)	2.94028+000	43.04413
-4.24820+001	-6.46250-001		
(-2.03379+001) + J(4.17102+000)	(1.00972-002) + J(5.01946-002)	1.02381-001	-78.68103
-2.20350+001	8.58374-003		
-1.91544+001	-7.24356-004		
-1.61691+001	-9.35046-003		
(-4.02905+000) + J(3.04256+000)	(-5.32056-004) + J(3.35126-004)	1.25761-003	-147.79440
-2.70385+000	1.76608-002		
-1.94643+000	-2.63309-003		
-7.15716-001	-7.92074-004		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(14) AND U(1) =

1	(-9.02158+003) + J(0.00000)	
2	(-8.80828+002) + J(0.00000)	
3	(-4.94016+001) + J(0.00000)	
4	(-2.29289+002) + J(0.00000)	
5	(-4.19514+001) + J(9.86179-001)	
6	(-4.19514+001) + J(-9.86179-001)	
7	(-2.37887+001) + J(0.00000)	
8	(-2.03460+001) + J(0.00000)	
9	(-1.86233+001) + J(0.00000)	
10	(-1.42040+001) + J(0.00000)	
11	(-3.93246+000) + J(3.22812+000)	
12	(-3.93246+000) + J(-3.22812+000)	
13	(-1.98537+000) + J(0.00000)	
14	(-6.33652-001) + J(0.00000)	
15	(-1.85708+000) + J(0.00000)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.06461+019	3.42052+019	3.86458+019	2.13998+019	6.68398+018	1.28646+018	1.56519+017	1.22529+016
6.24049+014	2.06322+013	4.33188+011	5.47927+009	3.73938+007	1.08380+005	8.98236+001	8.67500-003

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.12471-001		
-5.63031+001	-5.56948+000		
-1.80984+002	4.18609-001		
(-4.72635+001) + J(4.81644+000)	(4.49290-001) + J(-2.88303+000)	5.83566+000	81.14251
-4.24820+001	-1.17947-001		
(-2.03379+001) + J(4.17142+000)	(3.46317+000) + J(-2.60952-001)	6.94598+000	4.30912
-2.20350+001	-1.05319+000		
-1.91564+001	-3.91122-001		
-1.61691+001	-1.04625+000		
(-4.02906+000) + J(3.06256+000)	(-1.58505-002) + J(-3.05860-002)	6.88982-002	117.39441
-2.70386+000	-1.31213-001		
-1.96643+000	-4.28373-004		
-7.15716-001	-6.20626-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(15) AND U(1) =

1	(-5.83359+002) + J(0.00000)	
2	(-1.28791+002) + J(0.00000)	
3	(-4.44237+002) + J(0.00000)	
4	(-6.98082+001) + J(0.00000)	
5	(-5.37865+001) + J(0.00000)	
6	(-2.58355+001) + J(0.00000)	
7	(-4.49016+001) + J(0.00000)	
8	(-1.92333+001) + J(8.49025+000)	
9	(-1.92333+001) + J(-8.49025+000)	
10	(-1.92570+001) + J(0.00000)	
11	(1.16863+001) + J(0.00000)	
12	(-3.97763+000) + J(2.19282+000)	
13	(-3.97763+000) + J(-2.19282+000)	
14	(-1.96682+000) + J(0.00000)	
15	(-7.38159-001) + J(0.00000)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

2.51510+018	6.05594+018	4.57301+018	1.50300+018	2.39874+017	1.47009+016	-5.09275+014	-1.38448+014
-9.72135+012	-3.69604+011	-8.43746+009	-1.16871+008	-9.47011+005	-4.11686+003	-8.19058+000	-5.82000-003

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.40291-004		
-5.63031+001	-1.29596-002		
-1.80994+002	4.06828-003		
(-4.72635+001) + J(4.81664+000)	(2.65871-002) + J(-9.95775-002)	2.06132-001	75.05080
-4.24820+001	9.77771-002		
(-3.03379+001) + J(4.17142+000)	(-1.63463-002) + J(-4.01986-001)	8.04637-001	92.32858
-2.20350+001	6.15242-001		
-1.91544+001	6.93605-002		
-1.61691+001	-8.87504-001		
(-4.02906+000) + J(3.06256+000)	(1.59494-002) + J(-2.16994-002)	5.38608-002	53.68354
-2.70386+000	5.50769-002		
-1.96643+000	2.82187-005		
-7.15716-001	5.70288-004		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(16) AND U(1) =

1	(-8.43258+002)	+	J(0.00000)
2	(-1.05247+002)	+	J(4.53586+001)
3	(-1.05247+002)	+	J(-4.53586+001)
4	(4.28334+001)	+	J(0.00000)
5	(-4.11664+001)	+	J(2.36943+000)
6	(-4.11664+001)	+	J(-2.36943+000)
7	(-2.33480+001)	+	J(0.00000)
8	(-2.10053+001)	+	J(0.00000)
9	(-1.88909+001)	+	J(0.00000)
10	(-1.33346+001)	+	J(0.00000)
11	(-3.98693+000)	+	J(3.48904+000)
12	(-3.98693+000)	+	J(-3.48904+000)
13	(-2.62088+000)	+	J(0.00000)
14	(-1.94950+000)	+	J(0.00000)
15	(-6.88621-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

8.43387+018	2.03419+019	2.44337+019	1.20445+019	3.37350+018	5.79653+017	6.14747+016	3.95733+015
1.45608+014	2.24055+012	-3.07447+010	-1.97242+009	-3.47242+007	-2.81491+005	-1.00329+003	-8.48000-001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.07201+002	8.21149-001		
-5.67031+001	2.41263+001		
-1.80984+002	-1.21208+000		
(-4.72635+001) + J(4.81644+000)	(-1.28484+001) + J(-1.32343+001)	3.68906+001	134.15228
-4.24820+001	-2.81760+000		
(-2.03379+001) + J(4.17142+000)	(3.06450+000) + J(-9.90072-001)	6.44094+000	17.90449
-2.26350+001	-4.71220-001		
-1.97544+001	-2.77529-001		
-1.61591+001	-1.41561+000		
(-4.02900+000) + J(3.04256+000)	(-1.21921-002) + J(-3.64670-002)	7.69022-002	108.48645
-2.70395+000	-7.65398-003		
-1.26643+000	2.29291-004		
-7.15716-001	-1.82229-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(1) AND U(2) =

1	(2.07334+003)	+ J(0.00000)
2	(-8.88479+001)	+ J(6.64762+001)
3	(-8.88479+001)	+ J(-6.64762+001)
4	(-6.23434+001)	+ J(3.57182+001)
5	(-6.23434+001)	+ J(-3.57182+001)
6	(-5.00655+001)	+ J(0.00000)
7	(-2.68659+001)	+ J(0.00000)
8	(-3.81271+001)	+ J(0.00000)
9	(-1.80559+001)	+ J(2.89649+000)
10	(-1.80559+001)	+ J(-2.89649+000)
11	(-1.99977+001)	+ J(0.00000)
12	(-1.91423+001)	+ J(0.00000)
13	(-2.30253+000)	+ J(0.00000)
14	(-1.95718+000)	+ J(0.00000)
15	(-7.19635-001)	+ J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.60692+023	4.28501+023	3.78950+023	1.50145+023	2.98855+022	3.46763+021	2.56190+020	1.26568+019
4.28901+017	1.00665+016	1.63698+014	1.79018+012	1.27178+010	5.25246+007	9.02387+004	-5.72700+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-3.10511+002		
-5.63031+001	-3.96211+002		
-1.80984+002	1.50610+002		
(-4.72635+001) + J(4.81664+000)	(6.31839+002) + J(-2.81084+002)	1.38308+003	23.98270
-4.24820+001	-5.73454+002		
(-2.03379+001) + J(4.17182+000)	(-1.67057+002) + J(3.37966+002)	7.54000+002	-116.30330
-2.20350+001	2.44194+002		
-1.91544+001	8.73042-001		
-1.61691+001	5.52758+002		
(-4.02906+000) + J(3.04256+000)	(3.26266+002) + J(-6.23519+003)	1.24874+004	87.00463
-2.70386+000	-1.30202+003		
-1.96643+000	-1.08936+001		
-7.15716-001	5.29402+000		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(2) AND U(2) =

1	(-2.93342+002) + J(0.00000)
2	(-1.04543+002) + J(4.70668+001)
3	(-1.04543+002) + J(-4.70668+001)
4	(-5.11281+001) + J(0.00000)
5	(-4.86634+001) + J(0.00000)
6	(7.33423+000) + J(3.00718+001)
7	(7.33423+000) + J(-3.00718+001)
8	(-2.74952+001) + J(0.00000)
9	(-2.02103+001) + J(0.00000)
10	(-1.91561+001) + J(0.00000)
11	(-1.76046+001) + J(0.00000)
12	(-1.13449+001) + J(0.00000)
13	(-2.01971+000) + J(0.00000)
14	(1.24909+000) + J(0.00000)
15	(-6.74934-001) + J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-8.70826+021	-1.30909+022	3.64882+021	7.03868+021	1.96948+021	2.55532+020	1.93721+019	9.79286+017
3.73302+016	1.17329+015	2.97516+013	5.47238+011	6.57328+009	4.71376+007	1.79219+005	2.61700+002

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.39474+002		
-5.63031+001	-2.69555+002		
-1.80984+002	4.93471+001		
(-4.72635+001) + J(4.81644+000)	(-2.90825+002) + J(-5.16312+002)	1.18517+003	119.39145
-4.24820+001	1.24570+003		
(-2.03379+001) + J(4.17142+000)	(-2.74229+002) + J(5.97496+002)	1.31484+003	-114.65342
-2.20350+001	3.56531+002		
-1.91544+001	1.86711-002		
-1.61691+001	-1.84367+002		
(-4.02906+000) + J(3.06256+000)	(6.73928+002) + J(-9.32852+002)	2.30165+003	54.15420
-2.70385+000	-1.23432+003		
-1.96643+000	-6.42975+001		
-7.15716-001	7.41546+000		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(3) AND U(2) =

	(-5.56272+002) + J(0.00000)
2	(-1.14147+002) + J(0.00000)
3	(-5.28099+001) + J(0.00000)
4	(-3.65884+001) + J(1.66672+001)
5	(-3.65884+001) + J(-1.66672+001)
6	(-4.23744+001) + J(0.00000)
7	(-2.36018+001) + J(4.55321+000)
8	(-2.36018+001) + J(-4.55321+000)
9	(-2.14376+001) + J(0.00000)
10	(-1.91507+001) + J(0.00000)
11	(-7.43329+000) + J(0.00000)
12	(1.80689+000) + J(0.00000)
13	(-2.06444+000) + J(0.00000)
14	(-6.61174-001) + J(1.88903-001)
15	(-6.61174-001) + J(-1.88903-001)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

2.08795+020	6.55835+020	5.95676+020	-2.12192+018	-1.66998+020	-5.96734+019	-9.60024+018	-8.93163+017
-5.29703+016	-2.09311+015	-5.59205+013	-1.00082+012	-1.15632+010	-7.95323+007	-2.73472+005	-2.92300+002

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	4.22617+001		
-5.63031+001	-7.71953+001		
-1.80984+002	-1.66439+002		
(-4.72635+001) + J(4.81644+000)	(1.60778+001) + J(-1.30662+002)	2.63294+002	82.98507
-4.20820+001	-2.94347+000		
(-2.03379+001) + J(4.17142+000)	(7.61258+001) + J(3.54727+001)	1.67970+002	-24.98433
-2.20350+001	-1.68185+001		
-1.91544+001	-4.70125-001		
-1.61691+001	-2.78010+002		
(-4.02906+000) + J(3.06256+000)	(3.67910+001) + J(-8.97666+001)	1.94027+002	67.71366
-2.70326+000	-4.73249+001		
-1.96643+000	-3.55214+000		
-7.15716-001	2.02477-001		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(4) AND U(2) =

1	(1.35536+002) + J(0.00000)
2	(-1.44023+002) + J(0.00000)
3	(-5.24758+001) + J(0.00000)
4	(-4.44000+001) + J(0.00000)
5	(-3.93782+001) + J(1.27790+001)
6	(-3.93782+001) + J(-1.27790+001)
7	(-2.18606+001) + J(5.13439+000)
8	(-2.18606+001) + J(-5.13439+000)
9	(-2.12533+001) + J(0.00000)
10	(-1.91508+001) + J(0.00000)
11	(-1.04651+001) + J(0.00000)
12	(1.27925+000) + J(0.00000)
13	(-2.04897+000) + J(0.00000)
14	(-8.81481-001) + J(9.89110-002)
15	(-8.81481-001) + J(-9.89110-002)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

8.32212+019	1.92712+020	8.38348+019	-8.52451+019	-7.60447+019	-2.06735+019	-2.86930+018	-2.37945+017
-1.25981+016	-4.30872+014	-9.61432+012	-1.25286+011	-6.80297+008	3.69313+006	6.77804+004	2.41000+002

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	3.65651+002		
-5.63031+001	-2.41286+001		
-1.89984+002	-6.05297+001		
(-4.72635+001) + J(4.81644+000)	(-6.06401+000) + J(-2.56569+001)	5.27276+001	103.29782
-4.24820+001	1.22927+001		
(-2.03379+001) + J(4.17102+000)	(1.16085+001) + J(1.40612+000)	2.33867+001	-6.90651
-2.20350+001	-6.31748+000		
-1.91544+001	-8.14687-002		
-1.61691+001	-4.16099+001		
(-4.03966+000) + J(3.06256+000)	(-5.06270-001) + J(-3.24263+001)	6.48605+001	90.89448
-2.70385+000	-1.36490+001		
-1.96063+000	-6.67892-001		
-7.15716-001	5.38306-002		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(5) AND U(2) =

1	(-4.92062+002)	+ J(0.00000)
2	(-1.82761+002)	+ J(0.00000)
3	(-5.65719+001)	+ J(0.00000)
4	(-4.69291+001)	+ J(3.75201+000)
5	(-4.69291+001)	+ J(-3.75201+000)
6	(-4.25852+001)	+ J(0.00000)
7	(-2.17021+001)	+ J(4.57815+000)
8	(-2.17021+001)	+ J(-4.57815+000)
9	(-2.11209+001)	+ J(0.00000)
10	(-1.91519+001)	+ J(0.00000)
11	(-1.43178+001)	+ J(0.00000)
12	(-2.30425+000)	+ J(1.09746+000)
13	(-2.30425+000)	+ J(-1.09746+000)
14	(-1.99356+000)	+ J(0.00000)
15	(-7.13465-001)	+ J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-8.37239+020	-2.47768+021	-2.65102+021	-1.42409+021	-4.29153+020	-7.57469+019	-8.36568+018	-6.08275+017
-3.00183+016	-1.01835+015	-2.36694+013	-3.69165+011	-3.69483+009	-2.18021+007	-6.42764+004	-6.60500+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-1.21328+000		
-5.63031+001	3.36894-001		
-1.80984+002	6.52845-001		
(-4.72635+001) + J(4.81644+000)	(-6.64741-001) + J(1.43109+000)	3.15588+000	-114.91487
-4.20820+001	1.37862-001		
(-2.03379+001) + J(4.17142+000)	(7.19505+000) + J(1.50935+000)	1.47033+001	-11.84745
-2.20350+001	-4.82511+000		
-1.91544+001	-3.36126-002		
-1.61691+001	-1.35920+001		
(-4.02906+000) + J(3.06256+000)	(-2.65313+001) + J(-2.34785+001)	7.08561+001	138.49320
-2.70386+000	-7.30333+000		
-1.96643+000	-2.21417-001		
-7.15716-001	1.32500-002		

F 100 ENGINE TRANSFER FUNCTIONS TRANSFER FUNCTION PROGRAM

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(6) AND U(2) =

1	(-5.05094+002)	+ J(0.00000	)
2	(-1.79016+002)	+ J(0.00000	)
3	(7.64703+001)	+ J(0.00000	)
4	(-5.19605+001)	+ J(2.07622+000)	
5	(-5.19605+001)	+ J(-2.07622+000)	
6	(-5.14846+001)	+ J(0.00000	)
7	(-3.90613+001)	+ J(0.00000	)
8	(-2.02672+001)	+ J(4.03575+000)	
9	(-2.02672+001)	+ J(-4.03575+000)	
10	(-2.12970+001)	+ J(0.00000	)
11	(-1.91507+001)	+ J(0.00000	)
12	(6.38383+000)	+ J(0.00000	)
13	(-2.22483+000)	+ J(0.00000	)
14	(-1.95620+000)	+ J(0.00000	)
15	(-7.20826-001)	+ J(0.00000	)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

3.57940+021	8.81710+021	6.52782+021	1.68104+021	4.32659+019	-3.12399+019	-4.75498+018	-3.28158+017
-1.26457+016	-2.72621+014	-2.49967+012	1.77789+010	6.80383+008	6.44200+006	2.40147+004	2.72400+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-2.60983-001		
-5.63031+001	3.35900+000		
-1.80984+002	5.06118-001		
(-4.72635+001) + J(4.81644+000)	(-1.00206+001) + J(-8.50876+000)	2.62916+001	139.66449
-4.20820+001	2.02157+001		
(-2.03379+001) + J(4.17102+000)	(5.92854+000) + J(1.02901+000)	1.20344+001	-9.84666
-2.20350+001	2.76191+001		
-1.91564+001	3.76767-001		
-1.61671+001	3.10110+002		
(-4.02906+000) + J(3.06256+000)	(-1.32918+002) + J(-2.86286+002)	6.31275+002	114.90475
-2.78386+000	-6.05254+001		
-1.96603+000	-3.15230-001		
-7.15716-001	1.75462-001		

F 100 ENGINE TRANSFER FUNCTIONS

TRANSFER FUNCTION PROGRAM

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(7) AND U(2) =

1	(-5.07663+002)	+ J(0.00000	)
2	(-1.78012+002)	+ J(0.00000	)
3	(6.24700+001)	+ J(0.00000	)
4	(-5.72966+001)	+ J(0.00000	)
5	(-4.77229+001)	+ J(0.00000	)
6	(-4.84163+001)	+ J(0.00000	)
7	(-3.96966+001)	+ J(0.00000	)
8	(-2.08133+001)	+ J(5.07493+000)	
9	(-2.08133+001)	+ J(-5.07493+000)	
10	(-2.00108+001)	+ J(0.00000	)
11	(-1.91581+001)	+ J(0.00000	)
12	(-2.02901+000)	+ J(0.00000	)
13	(-1.94290+000)	+ J(0.00000	)
14	(-4.15724-002)	+ J(0.00000	)
15	(-7.33280-001)	+ J(0.00000	)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-4.34288+019	-1.15931+021	-2.85756+021	-2.43511+021	-9.02208+020	-1.54309+020	-1.44251+019	-7.97887+017
-2.62717+016	-4.61059+014	-1.51926+012	1.03334+011	2.11724+009	1.76191+007	6.24371+004	6.92300+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.07201+002	-1.06779+000		
-5.63031+001	-3.37069+000		
-1.80984+002	1.80794+000		
(-4.72635+001) + J(4.81644+000)	(2.12574+000) + J(-2.27385+001)	4.56752+001	84.65912
-4.24820+001	1.71770+001		
(-2.03379+001) + J(4.17142+000)	(-6.48064+001) + J(-2.56295+001)	1.39381+002	158.42233
-2.20350+001	1.68011+002		
-1.91544+001	-1.07151-001		
-1.61691+001	4.91650+002		
(-4.02906+000) + J(3.06256+000)	(-2.13989+002) + J(-2.21781+002)	6.16369+002	133.97562
-2.70386+000	-5.15507+001		
-1.96645+000	-8.15293-002		
-7.15716-001	9.99248-002		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(8) AND U(2) =

1	(-4.77879+002)	+	J(0.00000)
2	(-2.76717+002)	+	J(0.00000)
3	(-7.48023+001)	+	J(0.00000)
4	(-5.27138+001)	+	J(0.00000)
5	(-3.56482+001)	+	J(0.00000)
6	(-4.40232+001)	+	J(0.00000)
7	(-3.87020+000)	+	J(2.16796+001)
8	(-3.87020+000)	+	J(-2.16796+001)
9	(1.08829+001)	+	J(0.00000)
10	(-2.04368+001)	+	J(0.00000)
11	(-1.73955+001)	+	J(0.00000)
12	(-1.91536+001)	+	J(0.00000)
13	(-2.10430+000)	+	J(0.00000)
14	(-1.63290+000)	+	J(0.00000)
15	(-7.31059-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

3.62147+021	9.51360+021	7.99325+021	2.60920+021	2.88843+020	6.04123+018	-1.46471+018	-1.79156+017
-1.15124+016	-4.90993+014	-1.40444+013	-2.58890+011	-2.89199+009	-1.77395+007	-5.00051+004	-4.90200+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-1.72643+000		
-5.63031+001	5.92301+001		
-1.80984+002	2.90359+001		
(-4.72635+001) + J(4.81644+000)	(-2.16215+001) + J(1.73513+002)	3.49709+002	-97.10303
-4.24820+001	-6.27075+001		
(-2.03379+001) + J(4.17142+000)	(2.56402+002) + J(-5.99201+002)	1.30351+003	66.83361
-2.20350+001	-4.04048+002		
-1.91544+001	-2.77263-001		
-1.61691+001	2.40725+002		
(-4.02906+000) + J(3.06254+000)	(-1.24122+002) + J(-3.47690+002)	7.38361+002	109.64612
-2.70386+000	-1.24641+002		
-1.96643+000	-6.36598+000		
-7.15716-001	4.37248-001		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(1) AND U(3) =

1	(-5.07989+002)	+ J(0.00000)	
2	(-7.85064+001)	+ J(0.00000)	
3	(-4.93103+001)	+ J(4.38106+001)	
4	(-4.93103+001)	+ J(-4.38106+001)	
5	(-4.91033+001)	+ J(0.00000)	
6	(-3.77788+001)	+ J(0.00000)	
7	(-2.64623+001)	+ J(0.00000)	
8	(-1.99733+001)	+ J(8.12111-001)	
9	(-1.99733+001)	+ J(-8.12111-001)	
10	(-1.70799+001)	+ J(3.09762+000)	
11	(-1.70799+001)	+ J(-3.09762+000)	
12	(-1.24412+001)	+ J(0.00000)	
13	(-2.37893+000)	+ J(0.00000)	
14	(-7.26740-001)	+ J(0.00000)	
15	(-1.95794+000)	+ J(0.00000)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-2.99635+021	-8.14224+021	-7.56928+021	-3.29305+021	-7.65797+020	-1.07567+020	-9.85378+018	-6.15811+017
-2.69112+016	-8.31056+014	-1.81160+013	-2.74958+011	-2.81138+009	-1.80343+007	-6.16286+004	-6.92400+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.25363+000		
-5.63031+001	-3.32204+001		
-1.80284+002	-4.51816+001		
(-4.72635+001) + J(4.81644+000)	(3.96292+001) + J(-1.47239+001)	8.45521+001	20.38208
-4.24820+001	-2.98742+001		
(-2.03379+001) + J(4.17142+000)	(-7.98108-001) + J(6.44831+000)	1.29950+001	-97.05562
-2.20350+001	3.88292+000		
-1.91544+001	-1.38204+000		
-1.61691+001	3.53891+000		
(-4.02300+000) + J(3.06256+000)	(-3.01627+001) + J(7.19085+001)	1.55957+002	-112.75604
-2.70386+000	1.44837+001		
-1.94693+000	1.83957-001		
-7.15716-001	-2.61777-001		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(2) AND U(3) =

1	(-4.87666+002)	+ J(0.00000)	
2	(-9.59704+001)	+ J(0.00000)	
3	(3.78198+001)	+ J(4.85783+001)	
4	(3.78198+001)	+ J(-4.85783+001)	
5	(-5.07100+001)	+ J(0.00000)	
6	(-4.82032+001)	+ J(0.00000)	
7	(-2.63009+001)	+ J(0.00000)	
8	(-2.02682+001)	+ J(0.00000)	
9	(-1.91869+001)	+ J(0.00000)	
10	(-1.73806+001)	+ J(0.00000)	
11	(-1.32613+001)	+ J(0.00000)	
12	(-9.16587+000)	+ J(0.00000)	
13	(-2.04289+000)	+ J(0.00000)	
14	(-2.91735-001)	+ J(1.31272-001)	
15	(-2.91735-001)	+ J(-1.31272-001)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-2.25460+019	-1.49053+020	-3.42997+020	-2.35610+020	-6.60322+019	-9.71350+018	-8.37950+017	-4.42770+016
-1.43467+015	-2.81275+013	-3.61478+011	-5.51317+009	-1.15179+008	-1.49338+006	-8.23795+003	-1.15200+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-5.63100-001		
-5.63031+001	-2.26009+001		
-1.80984+002	-1.48037+001		
(-4.72635+001) + J(4.87644+000)	(-1.57617+001) + J(-3.26180+001)	7.24531+001	115.79082
-4.24820+001	6.48951+001		
(-2.03379+001) + J(4.17182+000)	(-1.06742+000) + J(1.12801+001)	2.26610+001	-95.40573
-2.20350+001	5.66916+000		
-1.91564+001	-2.97429-002		
-1.61691+001	-1.18037+000		
(-4.02906+000) + J(3.06256+000)	(-1.18600+001) + J(8.11877+000)	2.87454+001	-145.60648
-2.70396+000	1.37528+001		
-1.96643+000	1.08578+000		
-7.15716-001	-3.66678-001		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(3) AND U(3) =

1	(-5.02355+002) + J(0.00000)
2	(-4.60727+001) + J(1.93546+001)
3	(-4.60727+001) + J(-1.93546+001)
4	(-5.23183+001) + J(0.00000)
5	(-4.23954+001) + J(0.00000)
6	(-2.33884+001) + J(3.04750+000)
7	(-2.33884+001) + J(-3.04750+000)
8	(-2.05455+001) + J(3.38294-001)
9	(-2.05455+001) + J(-3.38294-001)
10	(-1.37602+001) + J(0.00000)
11	(-2.08478+000) + J(0.00000)
12	(-6.16279+000) + J(0.00000)
13	(-5.39175-001) + J(1.28873+000)
14	(-5.39175-001) + J(-1.28873+000)
15	(-5.78594-001) + J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

6.08408+018	1.98249+019	2.45759+019	1.92387+019	9.21640+018	2.48753+018	3.97079+017	4.00209+016
2.66495+015	1.20559+014	3.72548+012	7.76870+010	1.06481+009	8.82835+006	3.73388+004	4.66300+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-1.70423-001		
-5.63031+001	-6.47245+000		
-1.80984+002	4.99303+001		
(-4.72635+001) + J(4.81664+000)	(1.48259+000) + J(-7.91027+000)	1.60960+001	79.38445
-4.20820+001	-1.53339-001		
(-2.03379+001) + J(4.17102+000)	(1.44021+000) + J(1.44683-001)	2.89492+000	-5.73668
-2.20350+001	-2.67433-001		
-1.91544+001	7.44359-001		
-1.61691+001	-1.77989+000		
(-4.02906+000) + J(3.06256+000)	(-8.11463-001) + J(8.99735-001)	2.42322+000	-132.04702
-2.70396+000	5.26440-001		
-1.94643+000	5.99844-002		
-7.15710-001	-1.00120-002		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(4) AND U(3) =

1	(-5.32150+002)	+	J(0.00000)
2	(-5.19288+001)	+	J(0.00000)
3	(-4.16239+001)	+	J(1.53623+001)
4	(-4.16239+001)	+	J(-1.53623+001)
5	(-4.01903+001)	+	J(0.00000)
6	(-2.23264+001)	+	J(4.46210+000)
7	(-2.23264+001)	+	J(-4.46210+000)
8	(-2.04567+001)	+	J(9.51441-002)
9	(-2.04567+001)	+	J(-9.51441-002)
10	(-1.41063+001)	+	J(0.00000)
11	(-5.15070+000)	+	J(0.00000)
12	(-2.07459+000)	+	J(0.00000)
13	(-8.50604-001)	+	J(5.51628-001)
14	(-8.50604-001)	+	J(-5.51628-001)
15	(-1.70964-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

3.24113+017	2.73767+018	5.85499+018	5.89487+018	2.96965+018	7.86516+017	1.22503+017	1.21505+016
8.04082+014	3.65072+013	1.14020+012	2.42229+010	3.37501+008	2.85038+006	1.21930+004	1.48100+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	-1.47625+000		
-5.63031+001	-2.02306+000		
-1.80984+002	1.81584+001		
(-4.72635+001) + J(4.81644+000)	-2.71478-001) + J(-1.58867+000)	3.22340+000	99.69723
-4.24820+001	6.40393-001		
(-2.03379+001) + J(4.17142+000)	1.96876-001) + J(-4.30714-002)	4.03064-001	12.34042
-2.20350+001	-1.00465-001		
-1.91544+001	1.28679-001		
-1.61071+001	-2.66976-001		
(-4.02905+000) + J(3.06256+000)	-1.30968-001) + J(3.83265-001)	8.10048-001	-108.86620
-2.70386+000	1.51831-001		
-1.94603+000	1.12786-002		
-7.15716-001	-2.66180-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(5) AND U(3) =

1	(-4.93049+002)	+ J(0.00000	)
2	(-2.66474+002)	+ J(0.00000	)
3	(-5.47808+001)	+ J(0.00000	)
4	(-4.99816+001)	+ J(8.77373+000)	
5	(-4.99816+001)	+ J(-8.77373+000)	
6	(-4.23287+001)	+ J(0.00000	)
7	(-2.32953+001)	+ J(0.00000	)
8	(-1.87856+001)	+ J(1.57788+000)	
9	(-1.87856+001)	+ J(-1.57788+000)	
10	(-1.71756+001)	+ J(3.20125+000)	
11	(-1.71756+001)	+ J(-3.20125+000)	
12	(-2.12323+000)	+ J(0.00000	)
13	(-1.59085+000)	+ J(0.00000	)
14	(-4.92388-001)	+ J(0.00000	)
15	(-9.42390-001)	+ J(0.00000	)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.20071+018	5.46946+018	8.87233+018	6.68738+018	2.54567+018	5.12047+017	6.10702+016	4.65682+015
2.36555+014	8.14349+012	1.89620+011	2.92279+009	2.84197+007	1.58776+005	4.25361+002	4.03200-001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	4.89840-003		
-5.63031+001	2.82469-002		
-1.80984+002	-1.95848-001		
(-4.72635+001) + J(4.81644+000)	(-4.60518-002) + J(8.47622-002)	1.92929-001	-118.51549
-4.24820+001	7.18194-003		
(-2.03379+001) + J(4.17142+000)	(1.25649-001) + J(-1.63195-002)	2.53408-001	7.40024
-2.20350+001	-7.67234-002		
-1.91564+001	5.35398-002		
-1.61691+001	-8.70195-002		
(-4.02906+000) + J(3.06256+000)	(2.12702-001) + J(3.87985-001)	8.84928-001	-61.26747
-2.70386+000	8.12420-002		
-1.96643+000	3.73903-003		
-7.15716-001	-6.55181-004		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(6) AND U(3) =

1	(-5.01049+002) + J(0.00000)	
2	(-1.88246+002) + J(0.00000)	
3	(-5.43100+001) + J(4.92352+000)	
4	(-5.43100+001) + J(-4.92352+000)	
5	(-4.80649+001) + J(0.00000)	
6	(-3.72179+001) + J(0.00000)	
7	(-2.01780+001) + J(3.97223+000)	
8	(-2.01780+001) + J(-3.97223+000)	
9	(-2.04962+001) + J(7.04276-001)	
10	(-2.04962+001) + J(-7.04276-001)	
11	(-1.20476+001) + J(0.00000)	
12	(5.28545+000) + J(0.00000)	
13	(-2.31070+000) + J(0.00000)	
14	(-1.95752+000) + J(0.00000)	
15	(-7.30374-001) + J(0.00000)	

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-6.45153+019	-1.60704+020	-1.23497+020	-3.49181+019	-1.50775+018	8.82875+017	1.87864+017	1.85227+016
1.09926+015	4.21539+013	1.06924+012	1.77550+010	1.85650+008	1.12587+006	3.35459+003	3.43600+000

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	1.05367-003		
-5.63031+001	2.81435-001		
-1.89984+002	-1.51831-001		
(-4.72635+001) + J(4.81644+000)	(-5.78714-001) + J(-5.57612-001)	1.60728+000	136.06387
-4.20820+001	1.05314+000		
(-2.03379+001) + J(4.17142+000)	(1.02312-001) + J(-1.69395-002)	2.07409-001	9.40100
-2.20350+001	4.39167-001		
-1.91544+001	-5.96590-001		
-1.61691+001	1.98541+000		
(-4.02906+000) + J(3.06256+000)	(3.53443-001) + J(3.92614+000)	7.88404+000	-84.85593
-2.76395+000	6.73282-001		
-1.96643+000	5.32323-003		
-7.15716-001	-8.67619-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(7) AND U(3) =

1	(-5.00924+002)	+	J(0.00000)
2	(-1.92488+002)	+	J(0.00000)
3	(-5.80014+001)	+	J(0.00000)
4	(-5.03058+001)	+	J(0.00000)
5	(-4.56875+001)	+	J(0.00000)
6	(-3.77235+001)	+	J(0.00000)
7	(-2.09419+001)	+	J(5.34825+000)
8	(-2.09419+001)	+	J(-5.34825+000)
9	(-1.99813+001)	+	J(0.00000)
10	(-1.89193+001)	+	J(0.00000)
11	(-1.14378+001)	+	J(0.00000)
12	(-2.06041+000)	+	J(0.00000)
13	(-1.94262+000)	+	J(0.00000)
14	(-8.80195-001)	+	J(0.00000)
15	(-5.38717-001)	+	J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

1.45444+019	6.34889+019	1.00350+020	7.41312+019	2.81564+019	5.80505+018	7.16762+017	5.67759+016
3.00120+015	1.07707+014	2.62106+012	4.23901+010	4.35569+008	2.60831+006	7.68922+003	7.82400+000

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.04201+002	4.31100-003		
-5.63031+001	-2.82616-001		
-1.80984+002	-5.42366-001		
(-4.72635+001) + J(4.81644+000)	(2.16995-001) + J(-1.37917+000)	2.79227+000	81.05850
-4.24820+001	8.94838-001		
(-2.03379+001) + J(4.17142+000)	(-1.20010+000) + J(-4.88300-002)	2.40219+000	177.67002
-2.20350+001	2.67153+000		
-1.91564+001	1.69584-001		
-1.61691+001	3.14768+000		
(-4.02965+000) + J(3.06256+000)	(1.57869+000) + J(3.51029+000)	7.69789+000	-65.78505
-2.70386+000	5.73447-001		
-1.96643+000	1.37477-003		
-7.15716-001	-4.94105-003		

ZEROES OF THE TRANSFER FUNCTION BETWEEN Y(8) AND U(3) =

1	(-5.01401+002)	+ J(0.00000)
2	(-7.73030+001)	+ J(2.99726+001)
3	(-7.73030+001)	+ J(-2.99726+001)
4	(-5.23118+001)	+ J(0.00000)
5	(-3.25765+001)	+ J(0.00000)
6	(-4.37268+001)	+ J(0.00000)
7	(1.91164+000)	+ J(1.09755+001)
8	(1.91164+000)	+ J(-1.09755+001)
9	(-2.04826+001)	+ J(0.00000)
10	(-1.94077+001)	+ J(0.00000)
11	(-1.70082+001)	+ J(0.00000)
12	(-2.18935+000)	+ J(0.00000)
13	(-1.12867+001)	+ J(0.00000)
14	(-7.49200-001)	+ J(0.00000)
15	(-1.74693+000)	+ J(0.00000)

COEFFICIENTS OF THE NUMERATOR POLYNOMIAL IN ASCENDING POWERS OF S =

-8.66422+019	-2.32032+020	-2.10144+020	-8.49703+019	-1.73845+019	-2.29459+018	-2.35172+017	-1.95252+016
-1.22447+015	-5.40323+013	-1.61133+012	-3.15619+010	-3.91133+008	-2.86199+006	-1.06111+004	-1.24300+001

RESIDUES OF THE TRANSFER FUNCTION=

POLE LOCATION	RESIDUE AT THE POLE	COMBINED RESIDUES=MAG*COS(WD*T+PHI) MAGNITUDE	PHI(DEG)
-5.01201+002	6.97013-003		
-5.63031+001	4.96615+000		
-1.80984+002	-8.71052+000		
(-4.72635+001) + J(4.81644+000)	(-1.98534+000) + J(1.05034+001)	2.13788+001	-100.70366
-4.24820+001	-3.26675+000		
(-2.03379+001) + J(4.17142+000)	(7.67664-001) + J(-1.12066+001)	2.24657+001	86.08129
-2.20350+001	-6.42472+000		
-1.91564+001	4.39094-001		
-1.61691+001	1.54119+000		
(-4.02906+000) + J(3.06256+000)	(-9.21898-003) + J(4.61072+000)	9.22145+000	-90.11456
-2.70386+000	1.38650+000		
-1.96643+000	1.07501-001		
-7.15715-001	-2.16209-002		

APPENDIX E

LINEAR QUADRATIC REGULATOR DESIGN DATA (OPTSYS PROGRAM)

Plant: $\dot{x} = Fx + Gu$

Outputs: $y = HY\ x + DY\ u$

Performance Index: $J = \frac{1}{2}\int_0^{\infty} [x^T A x + u^T B u]\, dt$

PARAMETER	VARIABLE	UNITS
x_1	Low Rotor Speed	RPM
x_2	High Rotor Speed	RPM
x_3	Augmentor Pressure	psia
x_4	Fuel Flow	lbm/hr
x_5	Burner Pressure	psia
u_1	Fuel Flow Command	lbm/hr
u_2	Nozzle Area	ft^2
u_3	CIVV	deg
u_4	RCVV	deg
u_5	Bleed Flow	Fraction Compressor Flow
y_1	Thrust	lbf
y_2	Airflow	lbm/sec
y_3	TT4	°R
y_4	Fan Surge Margin	Per cent
y_5	Compressor Surge Margin	Per cent
y_6	$\Delta p/p$ Parameter	---
y_7	$\Delta p/p$ Average	---

E.1 LQR BASELINE DESIGNS

DESIGN POINT	PLA (DEG)	ALT (FT)	Mn	PAGE
HPG1	83	45K	0.9	259
HPG2	83	30K	0.9	263
HPG3	83	0	0	267
HPG4	83	0	1.2	271
LPG1	20	30K	0.9	275
LPG2	20	0	0	279

F

	1	2	3	4	5
1	-9.6060-001	-5.9660-001	-1.1110+003	1.3370+000	1.2970+002
2	7.9550-001	-1.6440+000	-2.6480+002	-1.9100-001	6.7730+001
3	2.5900-003	-5.1810-003	-8.8860+000	7.3940-003	5.7560-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-7.4380-001	1.8160+000	6.5720+002	1.7250+000	-1.6970+002

G

	1	2	3	4	5
1	-2.3920-001	-3.6100+002	-2.7230+001	-8.0010+000	2.8000+003
2	4.1130-002	8.4880+001	1.7470+001	-1.4170+001	7.1940+003
3	-6.5480-004	-2.0770+001	9.1200-002	-7.4410-002	-3.7110+000
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-2.9390-001	-1.9360+002	-1.2390+001	1.4110+001	-1.9240+004

HY

	1	2	3	4	5
1	3.7060-001	-4.5590-001	-4.3170-002	-7.5150-002	4.3080+001
2	-4.3250-003	1.9050-006	-1.3180-002	2.2210-004	-4.3750-006
3	1.4950-001	-9.0040-002	-3.6140+001	4.1960-001	-1.0590+000
4	2.0680-004	1.8620-006	-6.0210-002	1.1650-005	2.9390-004
5	6.2040-005	-1.5240-004	-4.7990-002	8.3060-005	-1.1070-002
6	5.7050-005	-3.7290-005	-4.3920-002	-4.3720-005	7.9770-004
7	1.6770-005	3.3180-006	-1.1520-002	-8.7460-006	4.9380-005

DY

	1	2	3	4	5
1	5.2290-003	2.3820+002	9.0480+000	-3.0970+000	3.3790+003
2	6.3540-007	2.0400-001	1.7990-001	3.7430-004	1.5460+000
3	1.3790-002	5.1290+001	2.4430+000	-4.3940-001	1.9300+003
4	9.6070-007	2.5730-002	7.3550-004	1.4060-004	5.9090-001
5	2.5690-005	-1.9910-002	-1.0700-003	-1.6210-003	-4.0190-001
6	1.4180-005	2.8560-002	1.9010-003	-2.3970-004	2.6330-001
7	2.8970-006	9.0870-003	6.7140-004	4.8670-005	6.0650-002

A

	1	2	3	4	5
1	5.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	5.0000-004	0.0000	0.0000	0.0000
3	0.0000	0.0000	5.0000-001	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0000+000

B

	1	2	3	4	5
1	1.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	4.0000+002	0.0000	0.0000	0.0000
3	0.0000	0.0000	5.0000-001	0.0000	0.0000
4	0.0000	0.0000	0.0000	2.0000-001	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0000+004

! OPTIMAL CLOSED LOOP EIGENSYSTEM !

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.62414+002)+J(0.00000)	0.00000	1.00000	1	(-5.45051-001)+J(0.00000)	-.5450507	.00000
			2	(-3.97221-001)+J(0.00000)	-.3972211	.00000
			3	(-2.13960-003)+J(0.00000)	-.0021396	.00000
			4	(-2.12184-001)+J(0.00000)	-.2121841	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.00714+001)+J(1.98371+000)	1.02649+001	.98115	1	(-3.89151-001)+J(-2.92864-001)	.4870395	-143.03590
			2	(-3.55412-002)+J(1.10992-002)	.0372339	162.65685
			3	(-2.23742-003)+J(-2.10709-003)	.0030734	-136.71836
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.83738-003)+J(-2.39555-003)	.0030190	-52.51196
(-3.37406+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.32972-001)+J(0.00000)	-.1329716	.00000
			3	(6.54331-004)+J(0.00000)	.0006543	.00000
			4	(-6.07342-001)+J(0.00000)	-.6073425	.00000
			5	(-7.09095-003)+J(0.00000)	-.0070909	.00000
(-1.48428+000)+J(0.00000)	0.00000	1.00000	1	(-1.35220-001)+J(0.00000)	-.1352200	.00000
			2	(1.00000+000)+J(0.00000)	1.0000000	.00000
			3	(-1.53291-003)+J(0.00000)	-.0015329	.00000
			4	(-8.58619-001)+J(0.00000)	-.8586186	.00000
			5	(-1.05962-003)+J(0.00000)	-.0010596	.00000

THE RICCATI MATRIX

	1	2	3	4	5
1	1.2347-004	2.3903-005	1.0213-002	1.0949-005	4.9772-005
2	2.3903-005	2.2058-004	1.0223-003	1.4319-005	1.1662-004
3	1.0213-002	1.0223-003	1.3754+000	3.6966-005	2.5986-003
4	1.0949-005	1.4319-005	3.6966-005	4.4809-006	2.7335-005
5	4.9772-005	1.1662-004	2.5986-003	2.7335-005	2.4066-003

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	7.2996-001	1.1293+000	3.6698+000	3.4769-001	4.4277+000
2	3.9988-004	2.1873-005	6.3676-002	1.8154-005	1.3199-003
3	8.9853-003	3.3291-003	7.0699-001	7.8009-004	5.7799-002
4	6.7837-004	7.9766-003	1.5261-001	4.8977-004	1.5857-001
5	4.0205-005	5.8620-005	9.1052-003	3.9212-005	4.5335-003

F

	1	2	3	4	5
1	9.6060-001	5.9660-001	1.1110+003	1.3370+000	1.2970+002
2	7.9550-001	1.6440+000	2.6480+002	1.9100-001	6.7730+001
3	2.5900-003	5.1810-003	8.8860+000	7.3940-003	5.7560-001
4	0.0000	0.0000	0.0000	1.0000+001	0.0000
5	7.4380-001	1.8160+000	6.9720+002	1.7250+000	1.6970+002

G

	1	2	3	4	5
1	2.3920-001	3.6100+002	2.7230+001	8.0010+000	2.8000+003
2	4.1130-002	8.4880+001	1.7470+001	1.4170+001	7.1940+003
3	6.5480-004	2.0770+001	9.1200-002	7.4410-002	3.7110+000
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	2.9390-001	1.9360+002	1.2390+001	1.4110+001	1.9240+004

F

	1	2	3	4	5
1	5.3430-001	-3.3970+000	-6.6360+002	-1.5080+000	1.7160+002
2	4.1430-001	-2.5810+000	-3.2320+002	1.2570+000	4.7780+001
3	-5.7600-004	-2.1860-003	-1.1400+001	1.8150-002	5.6250-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-2.8310+000	4.9390+000	4.9750+002	2.7640+000	-2.0550+002

G

	1	2	3	4	5
1	6.0930-001	1.4630+003	3.0170-001	-1.6070+001	3.9560+004
2	-5.1420-001	3.1150+002	5.7120+000	-2.7810+001	8.8070+002
3	-8.0090-003	-5.8200+001	7.2380-002	-7.1990-002	-7.7230+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-2.2060-001	-1.6390+003	-5.6990+001	2.9720+001	-6.0330+004

HY

	1	2	3	4	
1	1.0360+000	-1.2340+000	3.9160+001	-2.3980-001	5.23[illegible]+001
2	-7.8610-003	-6.8940-005	-4.6250-003	1.4050-004	1.00[illegible]003
3	2.0070-001	-1.1190-001	1.7880+000	2.2950-001	-8.033[illegible]1
4	2.8730-004	-7.9550-005	-1.1700-002	-1.0020-004	1.333[illegible]03
5	-1.2830-004	2.0640-004	1.1070-002	9.4240-005	-6.5960-003
6	1.3070-004	-1.0690-004	-8.4650-003	-9.4120-005	1.5590-003
7	3.7140-005	-1.6370-005	-1.9240-003	-2.5820-005	3.1770-004

DY

	1	2	3	4	5
1	-1.0950-001	8.3780+002	2.5470+001	-7.2580+000	1.1850+004
~~2~~	~~2.5070-005~~	~~3.6060-001~~	~~3.5450-001~~	~~-2.9010-004~~	~~1.0670+000~~
3	-5.9120-002	1.3530+002	3.8250+000	-1.9050-001	2.5730+003
4	3.1670-005	9.4930-002	6.2020-003	-1.0310-004	1.3070+000
~~5~~	~~-1.0660-005~~	~~-9.0300-002~~	~~-2.7010-003~~	~~-1.1250-003~~	~~-1.4060+000~~
6	2.2210-005	1.0380-001	3.7260-003	-3.9640-004	1.2570+000
7	7.3960-006	2.9790-002	1.1840-003	-4.0500-006	3.2490-001

A

	1	2	3	4	5
1	1.0000-003	0.0000	0.0000	0.0000	0.0000
2	0.0000	1.0000-003	0.0000	0.0000	0.0000
~~3~~	~~0.0000~~	~~0.0000~~	~~2.0000+000~~	~~0.0000~~	~~0.0000~~
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	4.0000+000

B

	1	2	3	4	5
1	1.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	1.0000+003	0.0000	0.0000	0.0000
~~3~~	~~0.0000~~	~~0.0000~~	~~1.0000+000~~	~~0.0000~~	~~0.0000~~
4	0.0000	0.0000	0.0000	8.0000-001	0.0000
5	0.0000	0.0000	0.0000	0.0000	8.0000+004

A3/0.9/30K OPTIMAL CONTROL DESIGN POINT HPG2

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

OPTIMAL CLOSED LOOP EIGENSYSTEM

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-5.04283+002)+J(0.00000)	0.00000	1.00000	1	(-7.21982-001)+J(0.00000)	-.7219823	.00000
			2	(-1.11701-001)+J(0.00000)	-.1117007	.00000
			3	(7.55761-004)+J(0.00000)	.0007558	.00000
			4	(-2.07996-001)+J(0.00000)	-.2079965	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.31777+001)+J(3.33[illegible]1+000)	1.35941+001	.96937	1	(-5.34555-003)+J(-1.33037-001)	.1331439	-92.30097
			2	(-1.31589-001)+J(-1.32226-001)	.1865459	-134.86171
			3	(-8.66465-004)+J(-4.21916-003)	.0043072	-101.60515
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.35632-003)+J(-1.78615-003)	.0022428	-52.78872
(-2.47364+000)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-8.51196-001)+J(0.00000)	-.8511961	.00000
			3	(3.67416-003)+J(0.00000)	.0036742	.00000
			4	(7.87826-001)+J(0.00000)	.7878260	.00000
			5	(-2.46840-003)+J(0.00000)	-.0024684	.00000
(-4.13540+000)+J(0.00000)	0.00000	1.00000	1	(-2.59638-001)+J(0.00000)	-.2596383	.00000
			2	(-5.83913-001)+J(0.00000)	-.5839131	.00000
			3	(3.59267-004)+J(0.00000)	.0003593	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(9.83289-004)+J(0.00000)	.0009833	.00000

THE RICCATI MATRIX

83/0.9/30K OPTIMAL CONTROL DESIGN POINT HPG2

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

	1	2	3	4	5
1	2.6676-004	-5.9651-005	-5.9069-003	-1.6594-005	1.5533-004
2	-5.9651-005	2.3551-004	-8.8824-004	3.4145-005	4.5905-005
3	-5.9069-003	-8.8824-004	3.9128-001	7.8270-004	9.5107-004
4	-1.6594-005	3.4145-005	7.8270-004	9.7516-006	2.3981-005
5	1.5533-004	4.5905-005	9.5107-004	2.3981-005	5.7571-003

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	-4.1529-001	[illegible]	-1.3411+001	-5.8288-001	9.6678+000
2	-4.6382-004	3.7150-005	3.3250-002	9.8500-005	9.2497-003
3	9.5392-003	1.5532-003	3.2737-002	1.1200-003	3.2772-001
4	-2.9768-003	5.2134-003	-1.4966-001	3.3147-005	-2.0907-001
5	-2.0814-005	6.0665-005	4.0257-003	2.6671-005	4.2652-003

	1	2	3	4	5
1	5.3430-001	-3.3970+000	-6.6360+002	-1.5080+000	1.7160+002
2	4.1430-001	-2.5810+000	-3.2320+002	1.2570+000	4.7780+001
3	-5.7600-004	-2.1660-003	-1.1400+001	1.8150-002	5.6250-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-2.8310+000	[illegible]	4.9750+002	2.7640+000	-2.0550+002

	1	2	3	4	5
1	6.0330-001	[illegible]	3.0170-001	-1.6070+001	3.9560+004
2	-5.1420-001	3.1150+002	5.7120+000	-2.7810+001	8.8070+002
3	-8.0090-003	[illegible]	7.2360-002	-7.1990-002	-7.7230+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-2.2060-001	-1.6590+003	-5.6990+001	2.9720+001	-6.0330+004

83/0/06 OPTIMAL CONTROL DESIGN POINT $\boxed{\text{HPG3}}$

SYSTEMS CONTROL, INC. (VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

F

	1	2	3	4	5
1	-3.2450+000	-2.1580+000	-9.1550+002	5.7310-001	1.3420+002
2	1.6420+000	-5.9410+000	-2.8160+002	1.8970-001	5.7050+001
3	1.6860-002	-2.5540-002	-1.0030+001	7.9940-003	5.8070-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-2.1630+000	6.8620+000	7.4050+002	1.1950+000	-1.7150+002

G

	1	2	3	4	5
1	1.4320-002	-3.5530+002	-9.9060+001	-1.5490+001	2.2200+004
2	2.8710-001	7.2860+002	2.5140+001	-6.4870+001	8.1220+003
3	-2.4690-003	-1.0300+002	6.3330-001	-3.2130-001	-7.4180+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-1.3110-001	3.2950+002	-2.5000+001	6.2570+001	-6.4450+004

HY

	1	2	3	4	5
1	1.6620+000	-1.7680+000	7.9990+001	-1.8900-001	3.7710+001
2	1.3830-002	3.1420-005	-1.0600-002	1.2890-004	-1.6390-007
3	1.6940-001	-1.1290-001	-4.9590+000	7.3860-002	-1.8350-001
4	7.5900-005	3.2690-006	-1.4770-002	2.2840-006	4.3150-005
5	-4.8590-005	1.3410-004	1.1400-002	1.9510-005	-2.6880-003
6	5.1770-005	-3.9690-005	-1.2300-002	-1.2280-005	2.0790-004
7	1.5700-005	2.2070-006	-3.2950-003	-2.6460-006	9.9150-006

83/0/06 OPTIMAL CONTROL DESIGN POINT HPG3

SYSTEMS CONTROL, INC. (VT) •
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

DY

	1	2	3	4	5
1	1.3020-001	1.9920+002	4.8020+001	-1.5030+001	1.0830+004
2	1.4490-007	3.3950-001	6.8060-001	2.8120-004	3.2040-004
3	2.9670-002	7.2270+001	2.5670+000	-7.6310-001	2.0660+003
4	1.0460-006	-7.7200-003	-5.8140-003	1.1570-004	6.6050-002
5	-9.3950-006	-7.2470-003	-6.8410-004	-9.6430-004	-2.8150-001
6	5.7270-006	3.6480-003	1.8330-003	-2.9020-004	1.8840-001
7	1.2840-006	2.3840-003	6.8810-004	4.6680-005	4.0650-002

A

	1	2	3	4	5
1	1.0000-003	0.0000	0.0000	0.0000	0.0000
2	0.0000	2.0000-003	0.0000	0.0000	0.0000
3	0.0000	0.0000	5.0000+000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	2.0000+000

F

	1	2	3	4	5
1	1.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	2.0000+003	0.0000	0.0000	0.0000
3	0.0000	0.0000	2.0000+000	0.0000	0.0000
4	0.0000	0.0000	0.0000	1.0000+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0000+005

OPTIMAL CLOSED LOOP EIGENSYSTEM

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-3.49854+002)+J(0.00000)	0.00000	1.00000	1	(-5.50266-001)+J(0.00000)	-.5502655	.00000
			2	(-2.72969-001)+J(0.00000)	-.2729695	.00000
			3	(-1.51009-003)+J(0.00000)	-.0015101	.00000
			4	(-1.10023-001)+J(0.00000)	-.1100233	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.00200+001)+J(2.96371+000)	1.04490+001	.95894	1	(-1.41786-001)+J(-3.36218-001)	.3648920	-112.86557
			2	(-6.55308-002)+J(-2.90665-002)	.0716878	-156.08011
			3	(-1.25673-003)+J(-2.35491-003)	.0026693	-118.08713
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(3.37945-004)+J(-9.43296-004)	.0010020	-70.28943
(-1.06634+001)+J(0.00000)	0.00000	1.00000	1	(-1.82264-001)+J(0.00000)	-.1822644	.00000
			2	(-3.88293-002)+J(0.00000)	-.0388293	.00000
			3	(1.43202-005)+J(0.00000)	.0000143	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(2.14294-003)+J(0.00000)	.0021429	.00000
(-6.13391+000)+J(0.00000)	0.00000	1.00000	1	(-9.38345-002)+J(0.00000)	-.0938345	.00000
			2	(-3.14987-001)+J(0.00000)	-.3149871	.00000
			3	(1.18750-003)+J(0.00000)	.0011875	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(6.90898-004)+J(0.00000)	.0006909	.00000

THE RICCATI MATRIX

	1	2	3	4	5
1	9.5827-005	1.4722-005	-3.8434-003	3.9513-006	2.6971-005
2	1.4722-005	2.4402-004	1.3625-003	1.4631-005	1.5161-004
3	-3.8434-003	1.3625-003	7.6721-001	5.5453-004	7.3596-003
4	3.9513-006	1.4631-005	5.5453-004	2.3830-006	2.0216-005
5	2.6971-005	1.5161-004	7.3596-003	2.0216-005	3.9162-003

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	-5.1065-001	-1.2164+000	-3.0051+001	-2.4068-001	2.6550+000
2	-1.9072-004	-4.5635-005	3.7142-002	2.0599-005	-3.1661-004
3	6.1154-003	[illegible]	-3.5768-001	8.8901-005	4.6052-002
4	-4.8312-006	7.2190-003	-1.8902-001	-7.6411-005	-2.3242-001
5	-7.9376-006	7.5264-005	6.0598-003	1.1375-005	2.5111-003

F

	1	2	3	4	5
1	-3.2450+000	-2.1560+000	-9.1550+002	5.7310-001	1.3420+002
2	1.6420+000	-5.9510+000	-2.8160+002	1.8970-001	5.7050+001
3	1.6860-002	-2.5540-002	-1.0030+001	7.9940-003	5.8070-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-2.1630+000	6.8620+000	7.4050+002	1.1950+000	-1.7150+002

G

	1	2	3	4	5
1	1.4320-002	-3.5530+002	-9.9060+001	-1.5490+001	2.2200+004
2	2.8710-001	7.2460+002	2.5140+001	-6.4870+001	8.1220+003
3	-2.4690-003	-1.0300+002	6.3330-001	-3.2130-001	-7.4180+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-1.3110-001	3.2950+002	-2.5000+001	6.2570+001	-6.4450+004

83/1.2/0K OPTIMAL CONTROL DESIGN POINT HPG4

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

F

	1	2	3	4	5
1	-9.0480+000	-6.9530-001	-5.8950+002	3.6140-001	1.3220+002
2	-1.9110+000	-6.4310+000	1.6130+002	-1.9550-001	4.1260+001
3	4.1400-003	-3.8860-002	-9.0290+000	1.1250-002	5.8890-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	5.1580+000	1.0870+001	-1.5450+001	1.7700+000	-1.7220+002

G

	1	2	3	4	5
1	-3.1750-002	-6.5550+001	-3.2200+002	5.0370+000	4.0620+004
2	6.6030-001	2.5670+003	-1.0020+002	-9.4500+001	1.3950+004
3	-2.3160-003	-1.3460+002	5.6570-001	-7.9360-001	-1.4360+002
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-5.1840-001	-1.5550+003	2.3090+002	1.8310+002	-1.1490+005

HY

	1	2	3	4	5
1	-8.3630-001	-3.3390+000	3.6220+002	-7.9180-001	4.3970+001
2	3.3770-002	1.0030-003	-6.9020-002	6.0470-004	-1.8610-003
3	-4.5100-002	-9.8560-002	1.0040+001	4.3160-002	-1.4990-001
4	2.4870-005	6.2070-005	-4.4080-003	1.0250-005	-1.1780-004
5	2.5100-005	3.3390-004	-3.8010-003	1.8330-005	-1.7320-003

DY

	1	2	3	4	5
1	6.5240-001	2.6700+003	-4.6490+001	-5.4290+001	2.5850+004
2	-1.1870-004	1.1870+000	1.8490+000	1.9070-002	9.0360+000
3	3.2710-002	1.5550+002	-4.0230+000	-3.1390+000	1.5570+003
4	-7.6900-006	-2.7080-002	-5.9360-003	1.2530-003	-1.1950-001
5	-1.6620-005	-5.6790-002	2.9480-003	9.1150-004	-1.1880-001

A

	1	2	3	4	5
1	4.0000-003	0.0000	0.0000	0.0000	0.0000
2	0.0000	2.0000-003	0.0000	0.0000	0.0000
3	0.0000	0.0000	3.0000+001	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	2.0000+000

B

	1	2	3	4	5
1	2.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	[illegible].0000+003	0.0000	0.0000	0.0000
3	0.0000	0.0000	2.0000+001	0.0000	0.0000
4	0.0000	0.0000	0.0000	8.0000+000	0.0000
5	0.0000	0.0000	0.0000	0.0000	8.0000+005

OPTIMAL CLOSED LOOP EIGENSYSTEM

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-2.86272+002)+J(0.00000)	0.00000	1.00000	1	(-6.25582-001)+J(0.00000)	-.6255823	.00000
			2	(-2.64835-001)+J(0.00000)	-.2648347	.00000
			3	(-1.53083-003)+J(0.00000)	-.0015308	.00000
			4	(-3.45999-001)+J(0.00000)	-.3459989	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.22957+001)+J(4.12893+000)	1.29704+001	.94798	1	(-2.06020-001)+J(-4.41336-001)	.4870541	-115.02360
			2	(3.51623-002)+J(1.07362-003)	.0351786	1.74888
			3	(-2.31289-003)+J(-2.43879-003)	.0033611	-133.48229
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(3.69424-003)+J(-3.67563-003)	.0052113	-44.85532
(-8.32037+000)+J(3.35619+000)	8.97176+000	.92740	1	(-2.23303-001)+J(1.13771-001)	.2506157	153.00159
			2	(-9.96760-002)+J(-1.86790-001)	.2117213	-118.08552
			3	(1.46656-003)+J(-2.22469-004)	.0014833	-8.62570
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-1.45989-003)+J(-3.79956-003)	.0040704	-111.01803

THE RICCATI MATRIX

	1	2	3	4	5
1	2.8960-004	1.5343-004	-6.4004-003	2.6270-005	2.8835-004
2	1.5343-004	4.4852-004	-4.3565-003	4.2746-005	3.8312-004
3	-6.4004-003	-4.3565-003	1.6186+000	1.5219-004	-3.0594-003
4	2.6270-005	4.2746-005	1.5219-004	7.3302-006	5.6744-005
5	2.8835-004	3.8312-004	-3.0594-003	5.6744-005	4.6924-003

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	-1.1008+000	-2.6511+000	1.6571+001	-3.5462-001	8.0709+000
2	-9.8517-005	-1.4150-004	2.7985-002	~~8.7683-008~~	7.4002-004
3	2.2833-003	4.1747-004	-1.3534-001	~~-2.2309-005~~	-4.7525-002
4	-5.6045-003	-3.9993-003	1.8316-001	~~-7.9523-004~~	-1.0336-001
5	2.2886-005	3.8632-005	2.5208-004	~~6.0974-006~~	6.5207-004

	1	2	3	4	5
1	-9.0480+000	-6.9530-001	-5.8950+002	3.6140-001	1.3220+002
2	-1.9110+000	-8.4310+000	1.6130+002	-1.9550-001	4.1260+001
3	4.1400-003	-3.8860-002	-9.0290+000	1.1250-002	5.8890-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	5.1590+000	1.0870+001	-1.5450+001	1.7700+000	-1.7220+002

	1	2	3	4	5
1	-3.1750-002	-6.5650+001	-3.2200+002	5.0370+000	4.0620+004
2	6.6030-001	2.5670+003	-1.0020+002	-9.4500+001	1.3950+004
3	-2.3160-003	-1.3460+002	5.6570-001	-7.9360-001	-1.4360+002
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-5.1840-001	-1.5550+003	2.3090+002	1.8310+002	-1.1490+005

2070.9/30K OPTIMAL CONTROL DESIGN POINT LPG1

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

F

	1	2	3	4	5
1	-1.1650+000	-2.7010-001	-5.0920+002	8.8230-001	1.2540+002
2	-4.4200-002	-1.8170+000	-1.4770+002	2.0020+000	3.9490+001
3	5.0840-003	-7.2730-003	-7.2810+000	1.2150-002	3.9300-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	2.3870-001	2.1060+000	1.0780+002	1.5580+000	-1.1790+002

G

	1	2	3	4	5
1	-4.7990-001	7.7410+001	-4.8320+000	-2.9200+000	5.1110+003
2	-5.2200-001	9.2910+000	-3.3860+000	-1.7770+001	-1.1870+003
3	-2.0450-003	-1.5350+001	2.7880-002	-1.0490-001	-1.4350+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-4.2770-001	-5.3170+001	5.8200+000	2.9420+001	-7.1520+003

HY

	1	2	3	4	5
1	-3.4830-002	-4.6380-001	2.5270+002	2.8200-001	2.4880+001
2	1.0980-002	1.6060-003	-7.5460-001	5.0550-004	7.6000-004
3	-1.2720-002	-1.0540-001	-1.9020+000	9.9330-001	-1.6870-001
4	1.1540-004	1.1140-004	-4.9890-002	2.0310-005	5.3280-005
5	3.5690-005	2.1460-004	1.3340-002	8.8000-005	-1.4850-002
6	9.6340-005	9.0430-006	-6.5740-002	-1.6380-005	4.7880-004
7	3.3820-005	2.6610-006	-1.4750-002	-5.3600-006	1.0510-004

DY

	1	2	3	4	5
1	-2.2910-001	-3.2300+000	-1.3410+000	-6.8840+000	7.8970+002
2	-4.8530-004	-1.3500-001	9.1760-002	2.5960-002	8.6940-001
3	-2.0190-001	1.6580+001	-7.2780-001	-2.8990+000	5.9800+002
4	-3.2190-005	-1.8430-002	-4.0680-003	1.8800-003	-7.6420-002
5	-1.6370-005	1.2660-003	7.2350-004	-3.4980-003	-1.3520-001
6	-2.0460-005	8.4490-003	1.0270-004	1.0390-004	1.4270-001
7	-3.0420-006	2.2840-003	2.0460-004	3.6540-005	3.2450-002

A

	1	2	3	4	5
1	2.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	1.0000-005	0.0000	0.0000	0.0000
3	0.0000	0.0000	2.0000-002	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	8.0000-001

B

	1	2	3	4	5
1	1.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	2.0000+002	0.0000	0.0000	0.0000
3	0.0000	0.0000	4.0000-002	0.0000	0.0000
4	0.0000	0.0000	0.0000	4.0000-001	0.0000
5	0.0000	0.0000	0.0000	0.0000	2.0000+004

OPTIMAL CLOSED LOOP EIGENSYSTEM

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.41766+002)+J(0.00000)	0.00000	1.00000	1	(-9.22497-001)+J(0.00000)	-.9224974	.00000
			2	(-2.65691-001)+J(0.00000)	-.2656911	.00000
			3	(-2.52690-003)+J(0.00000)	-.0025269	.00000
			4	(-7.79684-001)+J(0.00000)	-.7796843	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.06811+001)+J(0.00000)	0.00000	1.00000	1	(-3.61898-001)+J(0.00000)	-.3618981	.00000
			2	(-3.13014-001)+J(0.00000)	-.3130138	.00000
			3	(-3.96029-003)+J(0.00000)	-.0039603	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(2.98780-003)+J(0.00000)	.0029878	.00000
(-2.28888+000)+J(1.03678+000)	2.51283+000	.91088	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-3.04483-001)+J(7.51420-001)	.8107665	112.05830
			3	(9.72923-004)+J(-2.37215-003)	.0025639	-67.69932
			4	(-1.63704-001)+J(-7.26008-001)	.7442359	-102.70684
			5	(-4.09269-003)+J(2.68796-003)	.0048965	146.70425
(-8.73305+000)+J(0.00000)	0.00000	1.00000	1	(-5.85583-001)+J(0.00000)	-.5855833	.00000
			2	(-4.27102-001)+J(0.00000)	-.4271019	.00000
			3	(-7.48562-003)+J(0.00000)	-.0074856	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-2.16101-003)+J(0.00000)	-.0021610	.00000

THE RICCATI MATRIX

	1	2	3	4	5
1	6.3189-005	2.3667-005	-3.0085-003	1.2419-005	7.0598-005
2	2.3667-005	4.4995-005	-1.0187-003	2.1745-005	9.4460-005
3	-3.0085-003	-1.0187-003	2.1694-001	-3.2033-004	-5.6915-004
4	1.2419-005	2.1745-005	-3.2033-004	1.1039-005	5.7577-005
5	7.0598-005	9.4460-005	-5.6915-004	5.7577-005	3.2266-003

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	-5.7468-001	-1.4220+000	1.4280+001	-6.9112-001	8.8628+000
2	-2.3769-004	-2.4510-005	1.7711-002	-1.5095-005	7.8241-004
3	1.4615-003	-6.0275-003	-5.1806-001	-4.8133-003	-4.5255-001
4	-4.4688-003	-4.8653-003	3.1535-002	-3.2621-003	-2.3276-001
5	8.3441-006	2.9908-005	6.6049-004	1.8477-005	1.1410-003

F

	1	2	3	4	5
1	-1.1650+000	-2.7010-001	-5.0920+002	8.8230-001	1.2540+002
2	-4.4200-002	-1.8170+000	-1.4770+002	2.0020+000	3.9490+001
3	5.0840-003	-7.2730-003	-7.2810+000	1.2150-002	3.9300-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	2.3870-001	2.1060+000	1.0760+002	1.5580+000	-1.1790+002

G

	1	2	3	4	5
1	-4.7990-001	7.7410+001	-4.8320+000	-2.9200+000	5.1110+003
2	-5.2200-001	9.2910+000	-3.3860+000	-1.7770+001	-1.1870+003
3	-2.0450-003	-1.5350+001	2.7880-002	-1.0490-001	-1.4350+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-4.2770-001	-5.3170+001	5.8200+000	2.9420+001	-7.1520+003

F

	1	2	3	4	5
1	5.7960-001	1.7450+000	-6.2470+003	1.2200+001	6.9370+001
2	-1.9380+000	-5.0410+000	3.1560+003	-5.0140+000	1.1230+002
3	-1.7280-003	-2.1780-002	-2.2580-001	-2.5370-002	6.5630-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	1.6540+000	5.3490+000	-2.4140+003	6.4060+000	-1.5080+002

G

	1	2	3	4	5
1	-7.2510+000	-5.2160+003	9.8100+000	1.3620+001	-1.4420+004
2	4.3760+000	3.1720+003	-1.4110+001	-3.9600+001	5.7270+003
3	2.0370-002	2.7120-001	-1.8060-002	-2.0950-001	3.0760+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-4.0500+000	-2.3740+003	1.2340+001	5.1280+001	-1.0740+004

HY

	1	2	3	4	5
1	3.8070-002	-3.8050-001	6.1650+002	-2.2540-001	1.1860+001
2	2.6490-002	7.6740-003	-1.8470+001	3.3700-002	-1.2450-001
3	-2.6550-001	-2.8260-001	4.2470+002	5.1540-002	6.0470-001
4	2.6270-004	2.5210-004	-5.9140-001	1.0750-003	-3.9870-003
5	7.1240-004	1.7780-003	-1.4210+000	2.9100-003	-2.5870-002
6	2.3340-004	1.2480-004	-3.8930-001	6.9720-004	-2.5800-003
7	5.1750-005	2.1220-005	-6.7750-002	1.2050-004	-4.6880-004

DY

	1	2	3	4	5
1	2.3750-001	2.3940+002	7.5720-002	-3.8430+000	1.4800+002
2	-2.1890-002	-1.6320+001	1.6580-001	6.6930-002	-4.8010+001
3	4.1860-001	4.0310+002	-1.8370+000	-3.7320+000	1.0060+003
4	-7.0080-004	-5.2250-001	-2.0950-003	2.1450-003	-1.5480+000
5	-1.9590-003	-1.3140+000	5.3530-003	1.2050-002	-2.7270+000
6	-4.4750-004	-3.4000-001	1.1680-003	9.7800-004	-1.0420+000
7	-7.5700-005	-5.6560-002	3.2510-004	1.4630-004	-1.9960-001

A

	1	2	3	4	5
1	1.0000-005	0.0000	0.0000	0.0000	0.0000
2	0.0000	1.0000-004	0.0000	0.0000	0.0000
3	0.0000	0.0000	5.0000-002	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	8.0000-003

B

	1	2	3	4	5
1	1.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	1.0000+002	0.0000	0.0000	0.0000
3	0.0000	0.0000	2.0000-002	0.0000	0.0000
4	0.0000	0.0000	0.0000	2.0000-001	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0000+004

OPTIMAL CLOSED LOOP EIGENSYSTEM

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.51351+002)+J(0.00000)	0.00000	1.00000	1	(-5.58548-001)+J(0.00000)	-.5585477	.00000
			2	(-7.25977-001)+J(0.00000)	-.7259772	.00000
			3	(-4.62163-003)+J(0.00000)	-.0046216	.00000
			4	(-7.19496-002)+J(0.00000)	-.0719496	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-9.55230+000)+J(0.00000)	0.00000	1.00000	1	(4.08000-002)+J(0.00000)	.0408000	.00000
			2	(-2.81594-001)+J(0.00000)	-.2815940	.00000
			3	(1.88124-003)+J(0.00000)	.0018812	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.26317-003)+J(0.00000)	.0012632	.00000
(-5.74539+000)+J(6.24817-001)	5.77927+000	.99414	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.51881-001)+J(1.30769-002)	.1524432	175.07899
			3	(1.00060-003)+J(-1.21850-004)	.0010080	-6.94311
			4	(1.06219-001)+J(-2.43617-002)	.1089770	-12.91755
			5	(-8.16643-003)+J(1.56681-003)	.0083154	169.13924
(-1.94693+000)+J(0.00000)	0.00000	1.00000	1	(-2.00027-001)+J(0.00000)	-.2000266	.00000
			2	(1.00000+000)+J(0.00000)	1.0000000	.00000
			3	(-1.94116-004)+J(0.00000)	-.0001941	.00000
			4	(-7.06431-001)+J(0.00000)	-.7064310	.00000
			5	(2.30265-002)+J(0.00000)	.0230265	.00000

THE RICCATI MATRIX

	1	2	3	4	5
1	2.8058-006	1.1197-006	-1.5279-003	3.2298-006	-4.2043-006
2	1.1197-006	3.6048-005	2.7094-003	2.4459-006	3.9972-005
3	-1.5279-003	2.7094-003	1.4753+000	-2.2048-003	7.3602-003
4	3.2298-006	2.4459-006	-2.2048-003	4.9034-006	-5.1641-006
5	-4.2043-006	3.9972-005	7.3602-003	-5.1641-006	8.6130-005

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	-2.7568-002	-6.7338-001	-1.1290+001	-1.2320-001	4.5135-001
2	1.5472-005	-1.4398-004	4.7962-003	-2.5292-005	5.3608-004
3	6.2607-004	2.6662-003	-5.4816-001	1.3366-003	-1.6233-002
4	-4.9188-004	-3.4054-004	2.9868-001	-7.2116-004	-6.1730-003
5	3.5892-006	1.5566-005	-3.8793-004	4.4925-006	4.0909-005

F

	1	2	3	4	5
1	5.7960-001	1.7450+000	-6.2470+003	1.2200+001	6.9370+001
2	-1.9380+000	-5.0410+000	3.1560+003	-5.0140+000	1.1230+002
3	-1.7280-003	-2.1780-002	-2.2560-001	-2.5370-002	6.5630-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	1.6540+000	5.3490+000	-2.4140+003	6.4060+000	-1.5080+002

G

	1	2	3	4	5
1	-7.2510+000	-5.2160+003	9.8100+000	1.3620+001	-1.4420+004
2	4.3760+000	3.1720+003	-1.4110+001	-3.9600+001	5.7270+003
3	2.0370-002	2.9120-001	-1.8060-002	-2.0950-001	3.0760+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-4.0500+000	-2.3740+003	1.2340+001	5.1280+001	-1.0740+004

E.2 SUPERSONIC EVALUATION POINT DATA

This section contains closed-loop unnormalized eigensystem using off-design regulator gains from gain schedule algorithm (for open-loop data see Appendix D).

CASE	ALT (FT)	Mn	PLA (DEG)	DESCRIPTION
I	58.5K	2.15	83	Middle Pressure
II	75K	1.8	83	Low Pressure
III	40K	1.2	83	High Pressure

(16th order linear model plus one state for fuel flow lag)

AD-A052 346 SYSTEMS CONTROL INC PALO ALTO CALIF AERONAUTICAL AND--ETC F/G 21/5
F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM. VOLUME II. APPEND--ETC(U)
JUN 77 R L DE HOFF, W E HALL, R J ADAMS F33615-75-C-2053
UNCLASSIFIED AFAPL-TR-77-35-VOL-2 NL

4 OF 6
AD
A052346

OPTSYS CASE I

SYSTEMS CONTROL,INC.(VT) -
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+---------------+
! INPUT DATA    !
+---------------+
```

83/58.5K/2.15

NUMBER OF STATES =17
NUMBER OF CONTROLS = 5
NUMBER OF OUTPUTS = 7
NUMBER OF PROCESS NOISE SOURCES = 1
NUMBER OF OBSERVATIONS = 1

NUMBER OF SENSITIVITY PARAMETERS = 0

C

	1	2	3	4	5	6	7	8	9	10
1	-5.3400-001	-1.6300+000	-1.0800+001	-3.8200-001	6.2600+000	0.0000	0.0000	0.0000	0.0000	0.0000
2	-3.3200-004	-5.9200-003	4.2900-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	9.2700-003	0.0000	4.4100-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	-2.4600-003	6.8100-003	-1.6400-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	2.3000-005	5.8300-005	0.0000	0.0000	4.4000-003	0.0000	0.0000	0.0000	0.0000	0.0000

C

	11	12	13	14	15	16	17
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

CLOSED LOOP EIGENSYSTEM FOR GIVEN C

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-6.21546+002)+J(0.00000)	0.00000	1.00000	1	(6.02834-001)+J(0.00000)	.6028344	.00000
			2	(-4.09460-001)+J(0.00000)	-.4094598	.00000
			3	(1.81494-003)+J(0.00000)	.0018149	.00000
			4	(-1.63878-002)+J(0.00000)	-.0163878	.00000
			5	(1.07033-001)+J(0.00000)	.1070328	.00000
			6	(4.77057-001)+J(0.00000)	.4770568	.00000
			7	(-9.07702-001)+J(0.00000)	-.9077023	.00000
			8	(-3.76479-003)+J(0.00000)	-.0037648	.00000
			9	(-7.14908-003)+J(0.00000)	-.0071491	.00000
			10	(-3.95390-003)+J(0.00000)	-.0039539	.00000
			11	(5.43225-003)+J(0.00000)	.0054322	.00000
			12	(7.98816-005)+J(0.00000)	.0000799	.00000
			13	(-8.44609-003)+J(0.00000)	-.0084461	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(4.42332-002)+J(0.00000)	.0442332	.00000
			16	(1.02989-001)+J(0.00000)	.1029886	.00000
			17	(-3.04423-006)+J(0.00000)	-.0000030	.00000

(-1.93632+002)+J(0.00000)	0.00000	1.00000	1	(2.34202-001)+J(0.00000)	.2342024	.00000
			2	(7.49172-003)+J(0.00000)	.0074917	.00000
			3	(-6.16814-004)+J(0.00000)	-.0006168	.00000
			4	(1.31978-001)+J(0.00000)	.1319778	.00000
			5	(-3.58227-001)+J(0.00000)	-.3582267	.00000
			6	(1.90640-001)+J(0.00000)	.1906396	.00000
			7	(-1.09708-001)+J(0.00000)	-.1097076	.00000
			8	(-5.25122-003)+J(0.00000)	-.0052512	.00000
			9	(-1.31822-002)+J(0.00000)	-.0131822	.00000
			10	(1.60502-001)+J(0.00000)	.1605019	.00000
			11	(-3.46799-001)+J(0.00000)	-.3467990	.00000
			12	(-5.02336-003)+J(0.00000)	-.0050234	.00000
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(-3.26793-001)+J(0.00000)	-.3267931	.00000
			15	(-1.42933-002)+J(0.00000)	-.0142933	.00000
			16	(-2.67847-001)+J(0.00000)	-.2678473	.00000
			17	(7.23310-004)+J(0.00000)	.0007233	.00000
(-5.28680+001)+J(0.00000)	0.00000	1.00000	1	(5.28923-002)+J(0.00000)	.0528923	.00000
			2	(1.54064-002)+J(0.00000)	.0154064	.00000
			3	(-1.59129-005)+J(0.00000)	-.0000159	.00000
			4	(1.34173-002)+J(0.00000)	.0134173	.00000
			5	(1.26714-004)+J(0.00000)	.0001267	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(4.60736-004)+J(0.00000)	.0004607	.00000
			8	(-1.09580-003)+J(0.00000)	-.0010958	.00000
			9	(-1.23115-003)+J(0.00000)	-.0012311	.00000
			10	(2.22345-003)+J(0.00000)	.0022234	.00000
			11	(-1.92309-001)+J(0.00000)	-.1923087	.00000
			12	(-2.61238-003)+J(0.00000)	-.0026124	.00000
			13	(1.40417-002)+J(0.00000)	.0140417	.00000
			14	(-9.32800-001)+J(0.00000)	-.9328003	.00000
			15	(-3.90004-002)+J(0.00000)	-.0390004	.00000
			16	(-1.15757-001)+J(0.00000)	-.1157566	.00000
			17	(7.43238-004)+J(0.00000)	.0007432	.00000

(-6.42804+001)+J(0.00000)	0.00000	1.00000	1	(-4.32677-002)+J(0.00000)	-.0432677	.00000
			2	(-3.20361-002)+J(0.00000)	-.0320361	.00000
			3	(3.50681-004)+J(0.00000)	.0003507	.00000
			4	(-2.20336-002)+J(0.00000)	-.0220336	.00000
			5	(6.33321-003)+J(0.00000)	.0063332	.00000
			6	(-3.02099-001)+J(0.00000)	-.3020988	.00000
			7	(-4.12150-004)+J(0.00000)	-.0004121	.00000
			8	(1.90637-003)+J(0.00000)	.0019064	.00000
			9	(3.47132-003)+J(0.00000)	.0034713	.00000
			10	(-1.53443-002)+J(0.00000)	-.0153443	.00000
			11	(5.42254-001)+J(0.00000)	.5422536	.00000
			12	(7.48604-003)+J(0.00000)	.0074860	.00000
			13	(-1.89016-001)+J(0.00000)	-.1890156	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(4.22917-002)+J(0.00000)	.0422917	.00000
			16	(2.07054-001)+J(0.00000)	.2070542	.00000
			17	(-1.35568-003)+J(0.00000)	-.0013557	.00000
(-4.15899+001)+J(1.61519+000)	4.16212+001	99925	1	(2.49084-002)+J(-1.64132-002)	.0298299	-33.38270
			2	(-8.55713-002)+J(2.89039-003)	.0856201	178.06543
			3	(3.88991-004)+J(2.40809-004)	.0004575	31.76004
			4	(-5.78599-002)+J(-9.66708-003)	.0586620	-170.51479
			5	(6.43112-003)+J(2.56346-003)	.0069232	21.73236
			6	(-5.40060-002)+J(-1.49898-002)	.0560477	-164.48759
			7	(4.38436-004)+J(7.06441-004)	.0008314	58.17517
			8	(-5.81991-006)+J(9.55568-004)	.0009556	90.34896
			9	(5.60696-004)+J(1.59762-003)	.0016932	70.66113
			10	(-2.01165-002)+J(-1.32606-002)	.0240939	-146.60747
			11	(1.00000+000)+J(0.00000)	1.0000000	.00000
			12	(1.32483-002)+J(-6.17189-005)	.0132484	-.26692
			13	(2.17914-001)+J(4.41937-002)	.2223502	11.46430
			14	(-2.33345-001)+J(2.23576-001)	.3231658	136.22471
			15	(-9.54841-003)+J(9.21398-003)	.0132691	136.02116
			16	(1.44155-002)+J(1.95799-003)	.0145478	7.73488
			17	(-2.35716-004)+J(-1.40582-003)	.0014254	-99.51832

OPTSYS CASE I

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-1.33669+001)+J(7.52678+000)	1.53399+001	.87135	1	(5.44499-002)+J(-5.09099-001)	.5120024	-83.89522
			2	(-1.16185-001)+J(-2.39192-001)	.2659167	-115.90773
			3	(-6.28088-003)+J(-8.24938-003)	.0103683	-127.28478
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-2.91980-002)+J(2.94436-004)	.0291995	179.42224
			6	(-1.98325-004)+J(2.53080-001)	.2530802	90.04490
			7	(-6.00496-003)+J(-8.33031-004)	.0060625	-172.10213
			8	(-6.34329-002)+J(-5.11644-002)	.0814956	-141.11067
			9	(-1.27642-001)+J(-8.93122-002)	.1557854	-145.01913
			10	(-2.50862-001)+J(2.95975-001)	.3879860	130.28386
			11	(1.11483-001)+J(6.67093-001)	.6763439	80.51251
			12	(2.71077-003)+J(7.13957-003)	.0076369	69.20912
			13	(-8.44292-003)+J(5.85739-001)	.5858003	90.82581
			14	(7.92437-002)+J(4.96881-001)	.5031599	80.93864
			15	(5.55285-003)+J(1.75968-002)	.0184522	72.48639
			16	(1.10290-001)+J(3.77613-001)	.3933894	73.71834
			17	(-2.99835-001)+J(7.40785-002)	.3088510	166.12221
(-2.19122+000)+J(1.87294+000)	2.88260+000	.76016	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.84070-001)+J(5.77423-001)	.6060517	107.68120
			3	(5.82637-004)+J(-2.98684-003)	.0030431	-78.96206
			4	(-2.82915-001)+J(-7.25372-001)	.7785916	-111.30713
			5	(7.52728-003)+J(1.98622-003)	.0077849	14.78173
			6	(-1.06677-001)+J(-1.76941-001)	.2066108	-121.08572
			7	(1.85020-003)+J(-6.25468-004)	.0019531	-18.67502
			8	(3.57205-002)+J(-2.15969-002)	.0417418	-31.15705
			9	(4.08771-002)+J(-5.13356-002)	.0656222	-51.47066
			10	(3.00662-002)+J(2.21780-002)	.0373609	35.41801
			11	(-8.04691-002)+J(-2.06037-001)	.2211936	-111.33342
			12	(-4.08812-003)+J(2.06918-003)	.0045819	153.15399
			13	(-8.33289-002)+J(-2.46264-001)	.2599799	-108.69402
			14	(-6.38385-002)+J(-1.85072-001)	.1957730	-109.03129
			15	(-1.54324-002)+J(-2.38153-003)	.0156151	-171.22730
			16	(-1.07930-001)+J(-2.74311-001)	.2947799	-111.47761
			17	(3.83982-002)+J(-6.13241-002)	.0723538	-57.98719

OPTSYS CASE I

SYSTEMS CONTROL, INC. (VT) -
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(-1.00799+001)+J(0.00000)	0.00000	1.00000	1	(-1.22532-001)+J(0.00000)	-.1225323	.00000
			2	(-1.54887-001)+J(0.00000)	-.1548866	.00000
			3	(1.19959-003)+J(0.00000)	.0011996	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.10340-002)+J(0.00000)	.0110340	.00000
			6	(5.21969-001)+J(0.00000)	.5219685	.00000
			7	(3.58946-003)+J(0.00000)	.0035895	.00000
			8	(-1.37787-003)+J(0.00000)	-.0013779	.00000
			9	(1.00663-002)+J(0.00000)	.0100663	.00000
			10	(6.59637-002)+J(0.00000)	.0659637	.00000
			11	(6.99343-001)+J(0.00000)	.6993432	.00000
			12	(5.59275-003)+J(0.00000)	.0055928	.00000
			13	(6.93806-001)+J(0.00000)	.6938063	.00000
			14	(5.36338-001)+J(0.00000)	.5363375	.00000
			15	(1.49799-002)+J(0.00000)	.0149799	.00000
			16	(8.35549-001)+J(0.00000)	.8355486	.00000
			17	(2.09926-002)+J(0.00000)	.0209926	.00000
(-2.15278+001)+J(7.76094-001)	2.15418+001	.99935	1	(9.57410-003)+J(-1.40644-002)	.0170138	-55.75552
			2	(1.63192-002)+J(-3.50775-002)	.0386878	-65.05070
			3	(-1.76346-003)+J(-5.66672-004)	.0018523	-162.18560
			4	(8.31612-002)+J(-4.69555-002)	.0955018	-29.45087
			5	(-7.63382-003)+J(-4.09843-003)	.0088606	-149.49016
			6	(4.52000-001)+J(-3.14640-001)	.5507292	-34.84200
			7	(-1.92328-003)+J(-1.07556-003)	.0022036	-150.78466
			8	(1.93075-002)+J(4.62043-003)	.0198526	13.45828
			9	(5.10943-002)+J(8.15821-003)	.0517415	9.07183
			10	(-1.07933-001)+J(9.57005-002)	.1442505	138.43782
			11	(-2.07179-001)+J(1.00451-001)	.2302471	154.13351
			12	(-2.42140-003)+J(1.20267-003)	.0027036	153.58703
			13	(-1.39211-001)+J(5.03399-002)	.1480333	160.11960
			14	(-1.37640-001)+J(7.97851-002)	.1590924	149.90060
			15	(-5.15735-003)+J(3.03737-003)	.0059853	149.50447
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(-8.76987-001)+J(-3.55921-001)	.9951836	-143.27019

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OPTSYS    CASE I                                                                SYSTEMS CONTROL,INC.(VT) -
                                                                                 TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-1.81245+001)+J( 0.00000     )  0.00000      1.00000   1  ( 8.14677-003)+J( 0.00000     )   .0081468     .00000
                                                        2  ( 3.29687-003)+J( 0.00000     )   .0032969     .00000
                                                        3  ( 1.29033-003)+J( 0.00000     )   .0012903     .00000
                                                        4  (-8.57141-002)+J( 0.00000     )  -.0857141     .00000
                                                        5  ( 9.67336-003)+J( 0.00000     )   .0096734     .00000
                                                        6  ( 2.82626-001)+J( 0.00000     )   .2826263     .00000
                                                        7  ( 2.25087-003)+J( 0.00000     )   .0022509     .00000
                                                        8  (-2.29839-002)+J( 0.00000     )  -.0229839     .00000
                                                        9  (-5.95043-002)+J( 0.00000     )  -.0595043     .00000
                                                       10  ( 7.58269-002)+J( 0.00000     )   .0758269     .00000
                                                       11  ( 1.89525-001)+J( 0.00000     )   .1895250     .00000
                                                       12  ( 2.11110-003)+J( 0.00000     )   .0021111     .00000
                                                       13  ( 1.47235-001)+J( 0.00000     )   .1472346     .00000
                                                       14  ( 1.25960-001)+J( 0.00000     )   .1259600     .00000
                                                       15  ( 4.55475-003)+J( 0.00000     )   .0045547     .00000
                                                       16  ( 1.00000+000)+J( 0.00000     )  1.0000000     .00000
                                                       17  (-6.26690-001)+J( 0.00000     )  -.6266904     .00000

(-1.77922+000)+J( 0.00000     )  0.00000      1.00000   1  ( 6.93112-001)+J( 0.00000     )   .6931122     .00000
                                                        2  (-9.48243-001)+J( 0.00000     )  -.9482431     .00000
                                                        3  ( 1.94254-003)+J( 0.00000     )   .0019425     .00000
                                                        4  ( 1.00000+000)+J( 0.00000     )  1.0000000     .00000
                                                        5  ( 7.91415-003)+J( 0.00000     )   .0079142     .00000
                                                        6  ( 1.44065-001)+J( 0.00000     )   .1440650     .00000
                                                        7  ( 3.23909-003)+J( 0.00000     )   .0032391     .00000
                                                        8  ( 3.81497-002)+J( 0.00000     )   .0381497     .00000
                                                        9  ( 6.66126-002)+J( 0.00000     )   .0666126     .00000
                                                       10  ( 6.64529-003)+J( 0.00000     )   .0066453     .00000
                                                       11  ( 4.10088-001)+J( 0.00000     )   .4100884     .00000
                                                       12  (-1.75828-002)+J( 0.00000     )  -.0175828     .00000
                                                       13  ( 4.91953-001)+J( 0.00000     )   .4919530     .00000
                                                       14  ( 3.48761-001)+J( 0.00000     )   .3487609     .00000
                                                       15  ( 2.26454-001)+J( 0.00000     )   .2264536     .00000
                                                       16  ( 3.46413-001)+J( 0.00000     )   .3464128     .00000
                                                       17  ( 7.17262-002)+J( 0.00000     )   .0717262     .00000
```

OPTSYS CASE I

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-2.01525+001)+J(0.00000)	0.00000	1.00000	1	(2.03333-002)+J(0.00000)	.0203333	.00000
			2	(6.78019-002)+J(0.00000)	.0678019	.00000
			3	(3.44766-003)+J(0.00000)	.0034477	.00000
			4	(3.48645-002)+J(0.00000)	.0348645	.00000
			5	(2.18102-002)+J(0.00000)	.0218102	.00000
			6	(2.91764-001)+J(0.00000)	.2917636	.00000
			7	(5.35647-003)+J(0.00000)	.0053565	.00000
			8	(-5.46227-002)+J(0.00000)	-.0546227	.00000
			9	(-7.22804-003)+J(0.00000)	-.0072280	.00000
			10	(-9.40760-002)+J(0.00000)	-.0940760	.00000
			11	(4.37533-002)+J(0.00000)	.0437533	.00000
			12	(5.05518-004)+J(0.00000)	.0005055	.00000
			13	(6.20675-002)+J(0.00000)	.0620675	.00000
			14	(-4.99261-003)+J(0.00000)	-.0049926	.00000
			15	(-1.81300-004)+J(0.00000)	-.0001813	.00000
			16	(-6.39094-001)+J(0.00000)	-.6390944	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-6.42639-001)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.55177-001)+J(0.00000)	-.1551773	.00000
			3	(-1.31280-003)+J(0.00000)	-.0013128	.00000
			4	(-1.36734-001)+J(0.00000)	-.1367342	.00000
			5	(1.38503-002)+J(0.00000)	.0130503	.00000
			6	(-1.19702-001)+J(0.00000)	-.1197019	.00000
			7	(2.67215-003)+J(0.00000)	.0026722	.00000
			8	(2.56532-002)+J(0.00000)	.0256532	.00000
			9	(1.99745-002)+J(0.00000)	.0199745	.00000
			10	(5.61778-002)+J(0.00000)	.0561778	.00000
			11	(8.72928-002)+J(0.00000)	.0872928	.00000
			12	(2.33468-001)+J(0.00000)	.2334685	.00000
			13	(1.11486-001)+J(0.00000)	.1114855	.00000
			14	(9.81632-003)+J(0.00000)	.0098163	.00000
			15	(1.35911-003)+J(0.00000)	.0013591	.00000
			16	(-7.14789-002)+J(0.00000)	-.0714789	.00000
			17	(1.95391-002)+J(0.00000)	.0195391	.00000

OPTSYS CASE II

SYSTEMS CONTROL,INC.(VT) - TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

83/75K/1.8

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+--------------+
! INPUT DATA   !
+--------------+
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NUMBER OF STATES =17
NUMBER OF CONTROLS = 5
NUMBER OF OUTPUTS = 7
NUMBER OF PROCESS NOISE SOURCES = 1
NUMBER OF OBSERVATIONS = 1

NUMBER OF SENSITIVITY PARAMETERS = 0

C

	1	2	3	4	5	6	7	8	9	10
1	-7.3000-001	-1.1300+000	-3.7000+000	-5.8200-001	6.2600+000	0.0000	0.0000	0.0000	0.0000	0.0000
2	-4.3200-004	-2.2000-005	6.3700-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	9.2700-003	0.0000	-7.0700-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	-2.4600-003	6.8100-003	-1.6400-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	2.3000-005	5.8300-005	0.0000	0.0000	4.4000-003	0.0000	0.0000	0.0000	0.0000	0.0000

C

	11	12	13	14	15	16	17
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

OPTSYS CASE II

SYSTEMS CONTROL, INC. (VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

CLOSED LOOP EIGENSYSTEM FOR GIVEN C

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-5.30273+002)+J(0.00000)	0.00000	1.00000	1	(2.10450-001)+J(0.00000)	.2104475	.00000
			2	(-1.00366-001)+J(0.00000)	-.1003651	.00000
			3	(1.05687-003)+J(0.00000)	.0010569	.00000
			4	(5.53821-003)+J(0.00000)	.0055382	.00000
			5	(-3.86418-002)+J(0.00000)	-.0386418	.00000
			6	(6.35064-001)+J(0.00000)	.6350645	.00000
			7	(-2.81749-001)+J(0.00000)	-.2817486	.00000
			8	(3.13486-003)+J(0.00000)	.0031349	.00000
			9	(9.25586-003)+J(0.00000)	.0092559	.00000
			10	(3.28556-003)+J(0.00000)	.0032856	.00000
			11	(3.08718-003)+J(0.00000)	.0030872	.00000
			12	(4.40064-005)+J(0.00000)	.0000440	.00000
			13	(-6.84438-002)+J(0.00000)	-.0684438	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(4.41955-002)+J(0.00000)	.0441955	.00000
			16	(1.26650-001)+J(0.00000)	.1266500	.00000
			17	(-8.66893-005)+J(0.00000)	-.0000867	.00000

(-2.39713+002)+J(0.00000)	0.00000	1.00000	1	(2.60815-001)+J(0.00000)	.2608146	.00000
			2	(4.88731-002)+J(0.00000)	.0488731	.00000
			3	(1.47358-003)+J(0.00000)	.0014736	.00000
			4	(9.76496-002)+J(0.00000)	.0976496	.00000
			5	(-3.12263-001)+J(0.00000)	-.3122628	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(-1.49999-001)+J(0.00000)	-.1499995	.00000
			8	(8.50275-003)+J(0.00000)	.0085027	.00000
			9	(2.79076-002)+J(0.00000)	.0279076	.00000
			10	(2.18654-001)+J(0.00000)	.2186536	.00000
			11	(-1.45273-001)+J(0.00000)	-.1452733	.00000
			12	(-2.11549-003)+J(0.00000)	-.0021155	.00000
			13	(4.26952-001)+J(0.00000)	.4269521	.00000
			14	(4.62587-001)+J(0.00000)	.4625874	.00000
			15	(2.03127-002)+J(0.00000)	.0203127	.00000
			16	(-1.91580-001)+J(0.00000)	-.1915801	.00000
			17	(-2.19637-003)+J(0.00000)	-.0021964	.00000
(-4.95184+001)+J(9.96248+000)	5.05106+001	.98036	1	(-1.94715-002)+J(-8.17359-003)	.0211174	-157.22868
			2	(-1.73075-002)+J(1.17001-002)	.0208912	145.94085
			3	(-2.21318-005)+J(7.14198-006)	.0000233	162.11504
			4	(-4.59561-003)+J(-2.74090-003)	.0053509	-149.18745
			5	(-2.35101-003)+J(1.99473-003)	.0030832	139.68691
			6	(-2.19699-001)+J(-3.78934-001)	.4380169	-120.10437
			7	(-4.05833-004)+J(8.27839-004)	.0009220	116.11557
			8	(-8.07105-004)+J(4.58477-004)	.0009282	150.40118
			9	(-3.09790-003)+J(5.80560-004)	.0031518	169.38562
			10	(2.09496-002)+J(-7.37100-003)	.0222085	-19.38417
			11	(5.45024-001)+J(-4.81725-001)	.7273994	-41.47221
			12	(7.26210-003)+J(-6.66873-003)	.0098595	-42.56102
			13	(1.22419-001)+J(1.34273-001)	.1817025	47.64406
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(4.17572-002)+J(-5.63905-004)	.0417610	-.77370
			16	(1.28814-001)+J(-9.34903-002)	.1591653	-35.97119
			17	(1.86833-003)+J(2.12045-004)	.0018803	6.47503

(-5.25642+001)+J(0.00000)	0.00000	1.00000	1	(1.64362-002)+J(0.00000)	.0164362	.00000
			2	(4.06080-003)+J(0.00000)	.0040608	.00000
			3	(1.45853-005)+J(0.00000)	.0000146	.00000
			4	(4.49832-003)+J(0.00000)	.0044983	.00000
			5	(-1.25760-004)+J(0.00000)	-.0001258	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(1.18349-004)+J(0.00000)	.0001183	.00000
			8	(-5.71188-004)+J(0.00000)	-.0005712	.00000
			9	(-8.02505-004)+J(0.00000)	-.0008025	.00000
			10	(1.59982-003)+J(0.00000)	.0015998	.00000
			11	(-1.45415-001)+J(0.00000)	-.1454152	.00000
			12	(-1.97420-003)+J(0.00000)	-.0019742	.00000
			13	(9.12851-003)+J(0.00000)	.0091285	.00000
			14	(-7.79371-001)+J(0.00000)	-.7793714	.00000
			15	(-3.25843-002)+J(0.00000)	-.0325843	.00000
			16	(-1.06660-001)+J(0.00000)	-.1066599	.00000
			17	(4.74932-004)+J(0.00000)	.0004749	.00000
(-4.47644+001)+J(0.00000)	0.00000	1.00000	1	(-2.61514-002)+J(0.00000)	-.0261514	.00000
			2	(2.90493-002)+J(0.00000)	.0290493	.00000
			3	(-1.57588-006)+J(0.00000)	-.0000016	.00000
			4	(8.19416-003)+J(0.00000)	.0081942	.00000
			5	(-1.85735-003)+J(0.00000)	-.0018574	.00000
			6	(2.48431-001)+J(0.00000)	.2484307	.00000
			7	(1.03607-004)+J(0.00000)	.0001036	.00000
			8	(1.89803-004)+J(0.00000)	.0001898	.00000
			9	(-4.83307-004)+J(0.00000)	-.0004833	.00000
			10	(1.14680-002)+J(0.00000)	.0114680	.00000
			11	(-9.68096-001)+J(0.00000)	-.9680957	.00000
			12	(-1.29310-002)+J(0.00000)	-.0129310	.00000
			13	(-1.31504-001)+J(0.00000)	-.1315038	.00000
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(4.13274-002)+J(0.00000)	.0413274	.00000
			16	(4.09357-002)+J(0.00000)	.0409357	.00000
			17	(3.70548-004)+J(0.00000)	.0003705	.00000

(-1.99294+001)+J(3.16973+000)	2.00811+001	.98746	1	(-1.17575-002)+J(-2.28896-002)	.0257327	-117.18780
			2	(-1.31154-003)+J(-2.62204-002)	.0262532	-92.86353
			3	(-8.39373-004)+J(-3.49983-004)	.0009094	-157.36595
			4	(4.34709-002)+J(-3.62682-002)	.0566136	-39.83857
			5	(-4.44058-003)+J(-1.92641-003)	.0048404	-156.50786
			6	(-1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(-6.56045-004)+J(-1.91881-004)	.0006835	-163.69674
			8	(-5.87922-003)+J(1.56518-002)	.0167196	110.58744
			9	(4.32596-003)+J(4.47990-002)	.0450074	84.48481
			10	(-4.11470-002)+J(2.34183-001)	.2377704	99.96540
			11	(4.74920-002)+J(3.79404-001)	.3823651	82.86511
			12	(7.54214-004)+J(4.35688-003)	.0044217	80.17893
			13	(7.88034-003)+J(2.53492-001)	.2536140	88.21941
			14	(5.98603-002)+J(3.00582-001)	.3064842	78.73700
			15	(2.61413-003)+J(1.11015-002)	.0114051	76.74959
			16	(9.13702-001)+J(1.49713-001)	.9258858	9.30539
			17	(2.87839-001)+J(-1.03609-002)	.2880254	-2.06151
(-1.99575+001)+J(0.00000)	0.00000	1.00000	1	(3.46335-003)+J(0.00000)	.0034634	.00000
			2	(-1.10387-002)+J(0.00000)	-.0110387	.00000
			3	(-9.43741-004)+J(0.00000)	-.0009437	.00000
			4	(4.63354-002)+J(0.00000)	.0463354	.00000
			5	(-6.68942-003)+J(0.00000)	-.0066894	.00000
			6	(9.87720-001)+J(0.00000)	.9877204	.00000
			7	(-1.33570-003)+J(0.00000)	-.0013357	.00000
			8	(5.93565-002)+J(0.00000)	.0593565	.00000
			9	(1.68698-003)+J(0.00000)	.0016870	.00000
			10	(-1.31893-001)+J(0.00000)	-.1318932	.00000
			11	(4.73881-003)+J(0.00000)	.0047388	.00000
			12	(5.50314-005)+J(0.00000)	.0000550	.00000
			13	(1.78773-002)+J(0.00000)	.0178773	.00000
			14	(2.63423-002)+J(0.00000)	.0263423	.00000
			15	(9.76544-004)+J(0.00000)	.0009765	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(2.55633-001)+J(0.00000)	.2556334	.00000

(-1.83734+001)+J(0.00000)	0.00000	1.00000	1	(-6.60226-004)+J(0.00000)	-.0006602	.00000
			2	(-9.71404-004)+J(0.00000)	-.0009714	.00000
			3	(-3.70347-004)+J(0.00000)	-.0003703	.00000
			4	(4.09691-002)+J(0.00000)	.0409691	.00000
			5	(-3.45124-003)+J(0.00000)	-.0034512	.00000
			6	(2.96466-001)+J(0.00000)	.2964662	.00000
			7	(-6.11201-004)+J(0.00000)	-.0006112	.00000
			8	(2.84110-002)+J(0.00000)	.0284110	.00000
			9	(8.21888-002)+J(0.00000)	.0821888	.00000
			10	(-1.07791-001)+J(0.00000)	-.1077906	.00000
			11	(-9.20172-002)+J(0.00000)	-.0920172	.00000
			12	(-1.02874-003)+J(0.00000)	-.0010287	.00000
			13	(-5.98769-002)+J(0.00000)	-.0598769	.00000
			14	(-5.16320-002)+J(0.00000)	-.0516320	.00000
			15	(-1.87798-003)+J(0.00000)	-.0018780	.00000
			16	(-6.40007-001)+J(0.00000)	-.6400071	.00000
			17	(1.00000+000)+J(0.00000)	1.0000000	.00000

(-9.19698+000)+J(2.72153+000)	9.59120+000	.95890	1	(-1.59971-001)+J(-1.34556-001)	.2090364	-139.93183
			2	(-8.90354-002)+J(-5.46062-003)	.0892027	-176.49040
			3	(-1.49658-003)+J(-1.43439-003)	.0020730	-136.21548
			4	(5.07988-001)+J(-5.70319-002)	.5111796	-6.40578
			5	(4.38322-003)+J(3.48308-004)	.0043970	4.50340
			6	(2.76208-001)+J(-3.20644-001)	.4232056	-49.25784
			7	(1.18382-003)+J(-3.82675-004)	.0012441	-17.91359
			8	(-3.17629-002)+J(-2.75986-002)	.0420781	-139.01279
			9	(-8.52843-002)+J(-5.48634-002)	.1014071	-147.20685
			10	(7.71456-002)+J(1.52703-002)	.0786423	11.19605
			11	(9.81105-001)+J(-6.28722-002)	.9831178	-3.66667
			12	(7.68515-003)+J(-2.64386-003)	.0081272	-18.98436
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(7.50693-001)+J(-5.49625-002)	.7527028	-4.18747
			15	(2.08591-002)+J(-6.14727-003)	.0217460	-16.42049
			16	(7.43756-001)+J(-3.66867-001)	.8293159	-26.25540
			17	(-1.71641-001)+J(-5.86434-002)	.1813822	-161.13654

OPTSYN   CASE II

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-7.62386-001)+J(0.00000)	0.00000	1.00000	1	(-6.08453-001)+J(0.00000	)	-.6084535	.00000
			2	(1.00000+000)+J(0.00000	)	1.0000000	.00000
			3	(-1.13318-003)+J(0.00000	)	-.0011332	.00000
			4	(-5.58602-001)+J(0.00000	)	-.5586021	.00000
			5	(-7.63017-003)+J(0.00000	)	-.0076302	.00000
			6	(-2.50535-001)+J(0.00000	)	-.2505348	.00000
			7	(-1.98741-003)+J(0.00000	)	-.0019874	.00000
			8	(-4.51386-002)+J(0.00000	)	-.0451386	.00000
			9	(-6.60111-002)+J(0.00000	)	-.0660111	.00000
			10	(4.23412-002)+J(0.00000	)	.0423412	.00000
			11	(-5.83242-001)+J(0.00000	)	-.5832425	.00000
			12	(3.83416-001)+J(0.00000	)	.3834156	.00000
			13	(-7.26456-001)+J(0.00000	)	-.7264556	.00000
			14	(-5.39283-001)+J(0.00000	)	-.5392828	.00000
			15	(-8.20833-002)+J(0.00000	)	-.0820833	.00000
			16	(-5.59817-001)+J(0.00000	)	-.5598165	.00000
			17	(-6.74696-002)+J(0.00000	)	-.0674696	.00000
(-1.21352+000)+J(0.00000)	0.00000	1.00000	1	(-7.19027-001)+J(0.00000	)	-.7190266	.00000
			2	(1.00000+000)+J(0.00000	)	1.0000000	.00000
			3	(-1.25627-003)+J(0.00000	)	-.0012563	.00000
			4	(-4.96717-001)+J(0.00000	)	-.4967170	.00000
			5	(-4.10912-003)+J(0.00000	)	-.0041091	.00000
			6	(-2.13429-001)+J(0.00000	)	-.2134291	.00000
			7	(-1.35280-003)+J(0.00000	)	-.0013528	.00000
			8	(-5.42708-002)+J(0.00000	)	-.0542708	.00000
			9	(-8.36223-002)+J(0.00000	)	-.0836223	.00000
			10	(8.27097-002)+J(0.00000	)	.0827097	.00000
			11	(-4.41899-001)+J(0.00000	)	-.4418992	.00000
			12	(4.54393-002)+J(0.00000	)	.0454393	.00000
			13	(-5.50198-001)+J(0.00000	)	-.5501980	.00000
			14	(-3.75450-001)+J(0.00000	)	-.3754501	.00000
			15	(-8.03421-002)+J(0.00000	)	-.0803421	.00000
			16	(-4.30135-001)+J(0.00000	)	-.4301347	.00000
			17	(-8.75722-002)+J(0.00000	)	-.0875722	.00000

OPTSYS CASE II

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-2.12805+000)+J(3.26066-001)	2.15288+000	.98846	1	(-3.55599-001)+J(1.25055-001)	.3769481	160.62449
			2	(-4.15508-001)+J(-4.76800-002)	.4182345	-173.45388
			3	(2.74040-004)+J(1.00403-004)	.0002919	20.12182
			4	(6.60479-001)+J(-3.72601-002)	.6615289	-3.22885
			5	(7.24378-003)+J(2.51682-003)	.0076686	19.15958
			6	(3.19843-001)+J(-9.08314-003)	.3199718	-1.62669
			7	(1.69199-003)+J(2.81364-004)	.0017152	9.44143
			8	(-6.71942-003)+J(4.52398-003)	.0081004	146.04883
			9	(-1.15399-002)+J(3.83028-003)	.0121590	161.63823
			10	(3.40994-002)+J(2.06596-002)	.0398696	31.21017
			11	(8.36275-001)+J(-5.13567-003)	.8362912	-.35186
			12	(-2.27258-002)+J(-7.69233-003)	.0239924	-161.29981
			13	(1.00000+000)+J(0.00000)	1.0000000	.00000
			14	(6.63134-001)+J(-1.79734-002)	.6633774	-1.55255
			15	(-6.89341-002)+J(-2.33477-001)	.2434412	-106.44921
			16	(6.91505-001)+J(1.17931-002)	.6916052	.97704
			17	(-1.26555-002)+J(4.51276-003)	.0134360	160.37454
(-2.20947+001)+J(0.00000)	0.00000	1.00000	1	(2.32605-002)+J(0.00000)	.0232605	.00000
			2	(1.69582-002)+J(0.00000)	.0169582	.00000
			3	(-1.12790-004)+J(0.00000)	-.0001128	.00000
			4	(4.14630-002)+J(0.00000)	.0414630	.00000
			5	(2.26214-004)+J(0.00000)	.0002262	.00000
			6	(1.34015-001)+J(0.00000)	.1340145	.00000
			7	(-3.35380-004)+J(0.00000)	-.0003354	.00000
			8	(1.76905-002)+J(0.00000)	.0176905	.00000
			9	(8.29425-002)+J(0.00000)	.0829425	.00000
			10	(-2.84451-001)+J(0.00000)	-.2844510	.00000
			11	(-3.19777-001)+J(0.00000)	-.3197772	.00000
			12	(-3.77876-003)+J(0.00000)	-.0037788	.00000
			13	(-1.79733-001)+J(0.00000)	-.1797327	.00000
			14	(-2.65867-001)+J(0.00000)	-.2658670	.00000
			15	(-1.00467-002)+J(0.00000)	-.0100467	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(-7.71361-001)+J(0.00000)	-.7713607	.00000

OPTSYS CASE III

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

83/40K/2.2

```
+--------------+
!  INPUT DATA  !
+--------------+
```

NUMBER OF STATES =17
NUMBER OF CONTROLS = 5
NUMBER OF OUTPUTS = 5
NUMBER OF PROCESS NOISE SOURCES = 1
NUMBER OF OBSERVATIONS = 1

NUMBER OF SENSITIVITY PARAMETERS = 0

C

	1	2	3	4	5	6	7	8	9	10
1	-6.1600-002	-2.1200+000	-2.9400+001	-3.8200-001	6.2600+000	0.0000	0.0000	0.0000	0.0000	0.0000
2	-1.6800-004	-3.4000-008	3.3500-002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	5.1900-003	0.0000	-2.9300-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	-2.4600-003	-6.1300-003	-1.2400-001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	2.3000-005	5.8300-005	0.0000	0.0000	2.0600-003	0.0000	0.0000	0.0000	0.0000	0.0000

C

	11	12	13	14	15	16	17
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

CLOSED LOOP EIGENSYSTEM FOR GIVEN C

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-6.00479+002)+J(0.00000)	0.00000	1.00000	1	(-7.22348-001)+J(0.00000)	-.7223480	.00000
			2	(3.90321-001)+J(0.00000)	.3903210	.00000
			3	(-1.86402-003)+J(0.00000)	-.0018640	.00000
			4	(1.23061-002)+J(0.00000)	.0123061	.00000
			5	(9.95382-004)+J(0.00000)	.0009954	.00000
			6	(-2.42665-001)+J(0.00000)	-.2426645	.00000
			7	(1.00000+000)+J(0.00000)	1.0000000	.00000
			8	(3.64109-004)+J(0.00000)	.0003641	.00000
			9	(-3.35097-004)+J(0.00000)	-.0003351	.00000
			10	(-6.29511-004)+J(0.00000)	-.0006295	.00000
			11	(2.59843-004)+J(0.00000)	.0002598	.00000
			12	(3.54829-006)+J(0.00000)	.0000035	.00000
			13	(-2.71593-004)+J(0.00000)	-.0002716	.00000
			14	(-4.27399-001)+J(0.00000)	-.4273988	.00000
			15	(-1.89062-002)+J(0.00000)	-.0189062	.00000
			16	(-3.49738-002)+J(0.00000)	-.0349738	.00000
			17	(5.34005-006)+J(0.00000)	.0000053	.00000

OPTSYS CASE III

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-2.78580+002)+J(0.00000)	0.00000	1.00000	1	(-6.92478-001)+J(0.00000)	-.6924778	.00000
			2	(-8.16737-002)+J(0.00000)	-.0816737	.00000
			3	(2.14099-003)+J(0.00000)	.0021410	.00000
			4	(-2.42214-001)+J(0.00000)	-.2422144	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(-2.99410-001)+J(0.00000)	-.2994101	.00000
			7	(4.24454-001)+J(0.00000)	.4244538	.00000
			8	(-1.61882-004)+J(0.00000)	-.0001519	.00000
			9	(-4.04628-003)+J(0.00000)	-.0040463	.00000
			10	(-1.06987-001)+J(0.00000)	-.1069873	.00000
			11	(1.69200-001)+J(0.00000)	.1692003	.00000
			12	(2.46701-003)+J(0.00000)	.0024670	.00000
			13	(-6.69370-001)+J(0.00000)	-.6693704	.00000
			14	(2.67216-002)+J(0.00000)	.0267216	.00000
			15	(1.17113-003)+J(0.00000)	.0011711	.00000
			16	(1.50763-001)+J(0.00000)	.1507626	.00000
			17	(4.91418-004)+J(0.00000)	.0004914	.00000
(-4.86148+001)+J(7.55549+000)	4.91984+001	.98814	1	(-1.48891-001)+J(-4.38631-002)	.1552178	-163.58511
			2	(-7.82618-002)+J(1.17379-001)	.1410773	123.69309
			3	(1.81980-003)+J(-6.20461-004)	.0019227	-18.82678
			4	(-5.32282-002)+J(5.85801-002)	.0791509	132.25950
			5	(3.09291-003)+J(-2.57895-003)	.0040270	-39.82227
			6	(-2.29305-001)+J(-4.16410-001)	.4753715	-118.84038
			7	(4.22377-004)+J(2.08893-003)	.0021312	78.56907
			8	(1.53847-003)+J(1.79812-003)	.0023665	49.44477
			9	(-6.36660-004)+J(1.71442-003)	.0018288	110.37283
			10	(-3.32418-003)+J(-5.18615-003)	.0061601	-122.65875
			11	(3.05300-001)+J(-5.49572-001)	.6286791	-60.94680
			12	(4.01140-003)+J(-7.48746-003)	.0084943	-61.81989
			13	(1.14872-001)+J(3.96289-002)	.1215154	19.03358
			14	(1.00000+000)+J(0.00000)	1.0000000	.00000
			15	(4.16666-002)+J(-4.50558-004)	.0416691	-.61954
			16	(8.97266-002)+J(-8.52783-002)	.1237871	-43.54398
			17	(5.54067-004)+J(-1.02733-003)	.0011672	-61.66069

(-5.09976+001)+J(0.00000)	0.00000	1.00000	1	(6.62757-002)+J(0.00000)	.0662757	.00000
			2	(5.48193-003)+J(0.00000)	.0054819	.00000
			3	(8.85730-004)+J(0.00000)	.0008857	.00000
			4	(8.53634-003)+J(0.00000)	.0085363	.00000
			5	(1.59883-003)+J(0.00000)	.0015988	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(6.67495-004)+J(0.00000)	.0006675	.00000
			8	(-1.94541-003)+J(0.00000)	-.0019454	.00000
			9	(-2.67971-003)+J(0.00000)	-.0026797	.00000
			10	(3.41129-003)+J(0.00000)	.0034113	.00000
			11	(-2.65259-002)+J(0.00000)	-.0265259	.00000
			12	(-3.59325-004)+J(0.00000)	-.0003593	.00000
			13	(8.26953-004)+J(0.00000)	.0008270	.00000
			14	(-3.47616-001)+J(0.00000)	-.3476158	.00000
			15	(-1.45058-002)+J(0.00000)	-.0145058	.00000
			16	(-4.09197-002)+J(0.00000)	-.0409197	.00000
			17	(1.70855-003)+J(0.00000)	.0017086	.00000
(-4.91898+001)+J(0.00000)	0.00000	1.00000	1	(-3.64129-002)+J(0.00000)	-.0364129	.00000
			2	(5.07253-003)+J(0.00000)	.0050725	.00000
			3	(1.94662-003)+J(0.00000)	.0019466	.00000
			4	(1.69018-002)+J(0.00000)	.0169018	.00000
			5	(9.52059-004)+J(0.00000)	.0009521	.00000
			6	(1.00000+000)+J(0.00000)	1.0000000	.00000
			7	(4.06667-004)+J(0.00000)	.0004067	.00000
			8	(-5.86190-004)+J(0.00000)	-.0005862	.00000
			9	(-2.73480-003)+J(0.00000)	-.0027348	.00000
			10	(1.33639-003)+J(0.00000)	.0013364	.00000
			11	(-2.59336-002)+J(0.00000)	-.0259336	.00000
			12	(-3.50197-004)+J(0.00000)	-.0003502	.00000
			13	(-7.99990-004)+J(0.00000)	-.0008000	.00000
			14	(3.41776-001)+J(0.00000)	.3417764	.00000
			15	(1.42289-002)+J(0.00000)	.0142289	.00000
			16	(1.75682-002)+J(0.00000)	.0175682	.00000
			17	(1.78451-003)+J(0.00000)	.0017845	.00000

(-1.29262+001)+J(6.55568+000)	1.44044+001	.89043	1	(2.07037-001)+J(-9.42806-001)	.9652706	-77.61460
			2	(1.91130-002)+J(-1.10031-001)	.1116783	-80.14568
			3	(-4.37932-003)+J(-1.33060-002)	.0140081	-108.21763
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(3.81851-003)+J(-4.30833-003)	.0057570	-48.44917
			6	(-2.77064-001)+J(1.36472-001)	.3088516	153.77675
			7	(1.71681-003)+J(-3.14705-003)	.0035849	-61.38618
			8	(-7.30762-002)+J(-6.74994-002)	.0994801	-137.27177
			9	(-1.23425-001)+J(-8.06638-002)	.1474460	-146.83353
			10	(-1.60558-001)+J(8.29528-002)	.1807205	152.67664
			11	(3.29707-002)+J(1.63063-001)	.1663630	78.56914
			12	(7.13646-004)+J(1.67642-003)	.0018220	66.94070
			13	(2.86971-002)+J(1.39471-001)	.1423930	78.37328
			14	(9.20958-003)+J(1.17387-001)	.1177478	85.51406
			15	(9.61864-004)+J(4.10734-003)	.0042185	76.81990
			16	(-1.32585-001)+J(4.73674-002)	.1407926	160.34025
			17	(-2.98259-001)+J(5.03613-002)	.3024805	170.41594
(-1.09192+001)+J(0.00000)	0.00000	1.00000	1	(-6.86400-002)+J(0.00000)	-.0686400	.00000
			2	(-1.43717-001)+J(0.00000)	-.1437170	.00000
			3	(2.15516-003)+J(0.00000)	.0021552	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(7.11447-003)+J(0.00000)	.0071145	.00000
			6	(2.26250-001)+J(0.00000)	.2262504	.00000
			7	(2.93032-003)+J(0.00000)	.0029303	.00000
			8	(-2.22507-004)+J(0.00000)	-.0002225	.00000
			9	(9.62285-003)+J(0.00000)	.0096229	.00000
			10	(7.31197-003)+J(0.00000)	.0073120	.00000
			11	(2.15372-001)+J(0.00000)	.2153723	.00000
			12	(1.84297-003)+J(0.00000)	.0018430	.00000
			13	(2.09645-001)+J(0.00000)	.2096449	.00000
			14	(1.67546-001)+J(0.00000)	.1675457	.00000
			15	(4.94692-003)+J(0.00000)	.0049469	.00000
			16	(3.06329-001)+J(0.00000)	.3063288	.00000
			17	(2.17392-002)+J(0.00000)	.0217392	.00000

(-2.28629+001)+J(0.00000)	0.00000	1.00000	1	(2.05990-002)+J(0.00000)	.0205990	.00000
			2	(1.35308-001)+J(0.00000)	.1353078	.00000
			3	(-6.39611-003)+J(0.00000)	-.0063961	.00000
			4	(2.22780-001)+J(0.00000)	.2227798	.00000
			5	(-1.61952-002)+J(0.00000)	-.0161952	.00000
			6	(4.98574-001)+J(0.00000)	.4985736	.00000
			7	(-4.43183-003)+J(0.00000)	-.0044318	.00000
			8	(2.61735-002)+J(0.00000)	.0261735	.00000
			9	(6.50070-002)+J(0.00000)	.0650070	.00000
			10	(-1.97408-001)+J(0.00000)	-.1974085	.00000
			11	(-3.64039-001)+J(0.00000)	-.3640391	.00000
			12	(-4.34143-003)+J(0.00000)	-.0043414	.00000
			13	(-2.22973-001)+J(0.00000)	-.2229730	.00000
			14	(-2.46439-001)+J(0.00000)	-.2464387	.00000
			15	(-9.38281-003)+J(0.00000)	-.0093828	.00000
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(-4.42798-001)+J(0.00000)	-.4427978	.00000
(-2.08915+001)+J(1.21111+000)	2.09266+001	.99832	1	(4.76529-002)+J(-1.23949-002)	.0492385	-14.58000
			2	(5.03757-002)+J(-5.55393-002)	.0749822	-47.79109
			3	(-1.63094-003)+J(1.66648-003)	.0023318	134.38255
			4	(1.43695-001)+J(-1.25900-001)	.1910474	-41.22348
			5	(-3.92725-003)+J(5.89795-003)	.0070858	123.65833
			6	(6.74091-001)+J(-1.68759-001)	.6948946	-14.05518
			7	(-9.60631-004)+J(1.60235-003)	.0018682	120.94322
			8	(1.52793-003)+J(-9.61938-003)	.0097400	-80.97463
			9	(2.10991-002)+J(-5.99365-003)	.0219339	-15.85833
			10	(-8.15659-002)+J(8.68238-002)	.1191275	133.21152
			11	(-1.21108-001)+J(1.47544-001)	.1908828	129.38002
			12	(-1.38399-003)+J(1.74247-003)	.0022252	128.45915
			13	(-8.17764-002)+J(9.28210-002)	.1237057	131.38044
			14	(-8.69466-002)+J(1.02097-001)	.1341030	130.41784
			15	(-3.20814-003)+J(3.86076-003)	.0050197	129.72522
			16	(1.00000+000)+J(0.00000)	1.0000000	.00000
			17	(-2.20039-001)+J(-1.77048-001)	.2824240	-141.17921

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(-5.44468+000)+J( 0.00000    )  0.00000     1.00000   1  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                      2  ( 9.12475-002)+J( 0.00000   )   .0912475    .00000
                                                      3  ( 6.91668-004)+J( 0.00000   )   .0006917    .00000
                                                      4  (-3.12229-001)+J( 0.00000   )  -.3122289    .00000
                                                      5  ( 2.31671-003)+J( 0.00000   )   .0023167    .00000
                                                      6  (-3.50180-002)+J( 0.00000   )  -.0350180    .00000
                                                      7  ( 1.24509-003)+J( 0.00000   )   .0012451    .00000
                                                      8  ( 5.03383-002)+J( 0.00000   )   .0503383    .00000
                                                      9  ( 5.50099-002)+J( 0.00000   )   .0550099    .00000
                                                     10  ( 3.01444-002)+J( 0.00000   )   .0301444    .00000
                                                     11  (-3.55168-002)+J( 0.00000   )  -.0355168    .00000
                                                     12  (-5.14452-005)+J( 0.00000   )  -.0000514    .00000
                                                     13  (-3.87432-002)+J( 0.00000   )  -.0387432    .00000
                                                     14  (-2.39197-002)+J( 0.00000   )  -.0239197    .00000
                                                     15  (-1.36424-004)+J( 0.00000   )  -.0001364    .00000
                                                     16  (-3.90866-002)+J( 0.00000   )  -.0390866    .00000
                                                     17  ( 7.45299-002)+J( 0.00000   )   .0745299    .00000

(-2.09234+000)+J( 0.00000    )  0.00000      .00000   1  (-8.00148-001)+J( 0.00000   )  -.8001480    .00000
                                                      2  (-5.69883-001)+J( 0.00000   )  -.5698833    .00000
                                                      3  ( 4.84362-003)+J( 0.00000   )   .0048436    .00000
                                                      4  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                      5  ( 9.22160-003)+J( 0.00000   )   .0092216    .00000
                                                      6  ( 1.37800-001)+J( 0.00000   )   .1378005    .00000
                                                      7  ( 3.18305-003)+J( 0.00000   )   .0031830    .00000
                                                      8  (-2.61868-002)+J( 0.00000   )  -.0261868    .00000
                                                      9  (-1.99666-002)+J( 0.00000   )  -.0199666    .00000
                                                     10  (-1.26448-002)+J( 0.00000   )  -.0126448    .00000
                                                     11  ( 1.07541-001)+J( 0.00000   )   .1075407    .00000
                                                     12  (-3.24234-003)+J( 0.00000   )  -.0032423    .00000
                                                     13  ( 1.25814-001)+J( 0.00000   )   .1258138    .00000
                                                     14  ( 9.34911-002)+J( 0.00000   )   .0934911    .00000
                                                     15  (-1.31620-001)+J( 0.00000   )  -.1316204    .00000
                                                     16  ( 1.68511-001)+J( 0.00000   )   .1685107    .00000
                                                     17  (-2.12935-002)+J( 0.00000   )  -.0212935    .00000
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OPTSYS    CASE III                                                                SYSTEMS CONTROL.INC.(VT) -
                                                                                   TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-1.70377+000)+J( 0.00000    )  0.00000        1.00000   1  ( 4.00012-001)+J( 0.00000    )   .4000122        .00000
                                                         2  (-5.72785-001)+J( 0.00000    )  -.5727850        .00000
                                                         3  ( 2.08691-003)+J( 0.00000    )   .0020869        .00000
                                                         4  ( 1.00000+000)+J( 0.00000    )  1.0000000        .00000
                                                         5  ( 1.33090-002)+J( 0.00000    )   .0133090        .00000
                                                         6  ( 4.98108-002)+J( 0.00000    )   .0498108        .00000
                                                         7  ( 4.95654-003)+J( 0.00000    )   .0049565        .00000
                                                         8  ( 1.68300-002)+J( 0.00000    )   .0168300        .00000
                                                         9  ( 2.09447-002)+J( 0.00000    )   .0209447        .00000
                                                        10  (-7.52711-004)+J( 0.00000    )  -.0007527        .00000
                                                        11  ( 9.69196-002)+J( 0.00000    )   .0969196        .00000
                                                        12  (-4.56022-003)+J( 0.00000    )  -.0045602        .00000
                                                        13  ( 1.17446-001)+J( 0.00000    )   .1174461        .00000
                                                        14  ( 8.90253-002)+J( 0.00000    )   .0890253        .00000
                                                        15  ( 4.39736-002)+J( 0.00000    )   .0439736        .00000
                                                        16  ( 8.39790-002)+J( 0.00000    )   .0839790        .00000
                                                        17  ( 2.27349-002)+J( 0.00000    )   .0227349        .00000

(-1.90834+001)+J( 0.00000    )  0.00000        1.00000   1  ( 2.88678-002)+J( 0.00000    )   .0288678        .00000
                                                         2  (-3.01242-002)+J( 0.00000    )  -.0301242        .00000
                                                         3  ( 8.10452-005)+J( 0.00000    )   .0000810        .00000
                                                         4  (-1.26938-001)+J( 0.00000    )  -.1269381        .00000
                                                         5  ( 1.13575-003)+J( 0.00000    )   .0011358        .00000
                                                         6  ( 3.54271-001)+J( 0.00000    )   .3542713        .00000
                                                         7  ( 3.64513-004)+J( 0.00000    )   .0003645        .00000
                                                         8  ( 4.81980-004)+J( 0.00000    )   .0004820        .00000
                                                         9  (-2.68701-002)+J( 0.00000    )  -.0268701        .00000
                                                        10  ( 5.27434-002)+J( 0.00000    )   .0527434        .00000
                                                        11  ( 7.24304-002)+J( 0.00000    )   .0724304        .00000
                                                        12  ( 8.20303-004)+J( 0.00000    )   .0008203        .00000
                                                        13  ( 4.87429-002)+J( 0.00000    )   .0487429        .00000
                                                        14  ( 5.33226-002)+J( 0.00000    )   .0533226        .00000
                                                        15  ( 1.95472-003)+J( 0.00000    )   .0019547        .00000
                                                        16  ( 1.00000+000)+J( 0.00000    )  1.0000000        .00000
                                                        17  (-5.78841-001)+J( 0.00000    )  -.5788407        .00000
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OPTSYS CASE III

SYSTEMS CONTROL,INC.(VT) -
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(-7.73112-001)+J(0.00000)	0.00000	1.00000	1	(1.10836-001)+J(0.00000)	.1108358	.00000
			2	(-6.24092-001)+J(0.00000)	-.6240924	.00000
			3	(3.18722-003)+J(0.00000)	.0031872	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.31222-002)+J(0.00000)	.0131222	.00000
			6	(7.18621-002)+J(0.00000)	.0718621	.00000
			7	(5.01352-003)+J(0.00000)	.0050135	.00000
			8	(6.69146-003)+J(0.00000)	.0066915	.00000
			9	(1.15137-002)+J(0.00000)	.0115137	.00000
			10	(-4.60168-003)+J(0.00000)	-.0046017	.00000
			11	(9.04853-002)+J(0.00000)	.0904853	.00000
			12	(-5.31956-002)+J(0.00000)	-.0531956	.00000
			13	(1.10984-001)+J(0.00000)	.1109837	.00000
			14	(9.44497-002)+J(0.00000)	.0944497	.00000
			15	(1.44734-002)+J(0.00000)	.0144734	.00000
			16	(1.05485-001)+J(0.00000)	.1054851	.00000
			17	(1.21019-002)+J(0.00000)	.0121019	.00000

APPENDIX F

SENSITIVITY DATA FOR LINEAR QUADRATIC REGULATOR GAINS AND GAIN SCHEDULES FOR MULTIVARIABLE CONTROLLER

F.1 UTILIZATION OF SENSITIVITY DATA TO SIMPLIFY CONTROL LAW

The controller gains resulting from LQR designs at the six design points (Appendix E) are compiled in Table F.1. These gains were smoothed and simplified using the sensitivity data in Section F.2 to form the final set of implemented control gains shown in Table F.2.

F.2 SENSITIVITY DATA

Sensitivities of the closed-loop eigenvalues are given as a function of each element of the regulator gain matrix and each diagonal element of the state and control weightings. The sensitivity of the eigenvalue, λ_i, to parameter, θ_j, is defined as follows:

$$S^{i}_{\theta_j} = \frac{\partial \lambda_i}{\partial \theta / \theta_o}$$

where θ_o is the baseline value of the C, A, or B matrices.

The sensitivity $S^{i}_{\theta_j}$ is a complex vector which is associated with a particular eigenvalue λ_i. The printout is organized to show all the sensitivities of a particular matrix element of the C, A, or B matrices in a group. The Baseline Parameter Value is the value, θ_o, in the matrix. The Pole Location column contains values of the five eigenvalues, λ_i, in the fifth order linear design mode. The

Table F.1

SCI (Vt) F100 Multivariable Controller, SCI-MVC-F100/4L, Raw Feedback Gain List

GAIN COMPONENT	REGULATOR CONTROL GAINS (RAW)								
	INTERMEDIATE				IDLE		$\times 10^{EXP}$	UNITS	FEEDBACK MATRIX ELEMENT
	HPG1	HPG2	HPG3	HPG4	LPG1	LPG2	EXP:		
WF/N1	-7.30	-4.15	-5.11	-11.0	-5.75	-0.28	-1	lbm/hr-rpm	(1,1)
WF/N2	-1.13	-1.81	-1.95	-2.65	-1.42	-0.67	0	lbm/hr-rpm	(1,2)
WF/PT6	-3.67	-13.4	-30.1	+16.6	14.28	-11.3	0	lbm/hr-psia	(1,3)
WF/WFC	-3.48	-5.83	-2.41	-3.55	-6.91	-1.23	-1	---	(1,4)
WF/PT4	4.43	9.67	2.86	8.08	8.86	0.45	0	lbm/hr-psia	(1,5)
AJ/N1	-4.00	-4.64	-1.91	-0.99	-2.38	0.15	-4	ft^2/rpm	(2,1)
AJ/N2	-2.19	3.75	4.56	-1.42	-6.45	-14.4	-5	ft^2/rpm	(2,2)
AJ/PT6	6.37	3.33	3.71	2.80	1.77	0.48	-2	ft^2/psia	(2,3)
CIVV/N1	8.99	9.54	6.12	2.28	1.46	0.63	-3	deg/rpm	(3,1)
CIVV/N2	-3.33	1.35	0.91	0.42	-6.02	2.67	-3	deg/rpm	(3,2)
CIVV/PT6	-7.07	-3.27	-3.58	-1.35	-5.18	-5.5	-1	deg/psia	(3,3)
RCVV/N1	-0.68	-2.98	-0.48	-5.60	-4.47	-0.49	-3	deg/rpm	(4,1)
RCVV/N2	7.98	5.20	7.25	-4.00	-4.87	-0.35	-3	deg/rpm	(4,2)
RCVV/PT6	-1.53	-1.50	-1.89	1.83	0.32	2.99	-1	deg/psia	(4,3)
BLC/N1	4.02	-2.08	0.79	2.29	0.83	0.36	-5	rpm^{-1}	(5,1)
BLC/N2	5.86	6.06	7.53	3.86	2.99	1.56	-5	rpm^{-1}	(5,2)
BLC/PT4	4.53	4.27	2.51	0.65	1.14	-0.39	-3	$psia^{-1}$	(5,5)

Table F.2

SCI (Vt) F100 Multivariable Controller, SCI-MVC-F100/4L, Smoothed Feedback Gain List

GAIN COMPONENT	RETULATOR CONTROL GAINS (SMOOTHED)								
	INTERMEDIATE				IDLE		$\times 10^{EXP}$	UNITS	FEEDBACK MATRIX ELEMENT
	HPG1	HPG2	HPG3	HPG4	LPG1	LPG2	EXP:		
WF/N1	-7.30	-4.63	-4.63	-11.0	-5.75	-0.28	-1	lbm/hr-rpm	(1,1)
WF/N2	-1.13	-1.81	-1.95	-2.65	-1.42	-0.67	0	lbm/hr-rpm	(1.2)
WF/PT6	-0.37	-1.34	-3.01	0.0	0.0	-1.13	1	lbm/hr-psia	(1.3)
WF/WFC	-3.82	-3.82	-3.82	-3.82	-4.07	-4.07	-1	---	(1,4)
WF/PT4	6.26	6.26	6.26	6.26	6.26	0.0	1	lbm/hr-psia	(1,5)
AJ/N1	-4.32	-4.32	-1.91	-0.99	-2.38	0.0	-4	ft^2/rpm	(2,1)
AJ/N2	-0.22	0.0	0.0	-0.14	-0.65	-1.44	-4	ft^2/rpm	(2,2)
AJ/PT6	6.37	3.52	3.52	2.80	1.77	0.48	-2	ft^2/psia	(2,3)
CIVV/N1	9.27	9.27	6.12	2.28	1.46	0.63	-3	deg/rpm	(3,1)
CIVV/PT6	-7.07	-3.43	-3.43	-1.35	-5.37	-5.37	-1	deg/psia	(3,3)
RCVV/N1	-2.46	-2.46	-2.46	-2.46	-2.46	-2.46	-3	deg/rpm	(4,1)
RCVV/N2	6.81	6.81	6.81	-4.00	-4.87	-0.35	-3	deg/rpm	(4,2)
RCVV/PT6	-1.64	-1.64	-1.64	0.0	0.0	2.99	-1	deg/psia	(4,3)
BLC/N1	2.30	2.30	2.30	2.30	0.60	0.60	-5	rpm^{-1}	(5,1)
BLC/N2	5.83	5.83	5.83	5.83	2.28	2.28	-5	rpm^{-1}	(5,2)
BLC/PT4	4.40	4.40	2.51	0.65	1.14	0.0	-3	$psia^{-1}$	(5,3)

Table F.3

Gain Component Symbol Index to Tables F.2 and F.3

SYMBOL	TITLE	UNITS
WF	Main Burner Fuel Flow	lbm/hr
N1	Low Rotor Speed	rpm
N2	High Rotor Speed	rpm
PT6	Augmentor Entrance Total Pressure	psia
WFC	Requested Fuel Flow	lbm/hr
PT4	Burner Pressure	psia
AJ	Jet Area	ft^2
CIVV	Compressor Inlet Variable Vane Angle	deg
RCVV	Rear Compressor Variable Stator Angle	deg
BLC	Bleed Percentage Flow	fraction

Table F.4

Index to Sensitivity Printout
(Design Point Data)

CASE	PLA (DEG)	ALTITUDE (FT)	MACH NO.	PAGE
HPG1	83	45,000	0.9	314
HPG2	83	30,000	0.9	327
HPG3	83	0	0	337
HPG4	83	0	1.2	350
LPG1	20	30,000	0.9	363
LPG2	20	0	0	376

Sensitivity data is organized into two columns containing the Real and Imaginary part of the complex vector:

$$S^{i}_{\theta_j} \cdot \theta_o = \frac{\partial \lambda_i}{\partial \theta_i}$$

Also, the Magnitude and Phase of $S^{i}_{\theta_j}$ is given. Note, if $\theta_o = 0$, then $\theta_o = 1$ is assumed.

83/45K/0.9 OPTIMAL CONTROL DESIGN POINT HPG1

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+------------------------------------+
! SENSITIVITY OF CLOSED LOOP SYSTEM  !
+------------------------------------+

SENSITIVITY TO   1  1 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -7.29963-001

   .........POLE LOCATION..........       ..........................SENSITIVITY...........................
       REAL              IMAGINARY              REAL             IMAGINARY           MAGNITUDE        PHASE

   (-2.62414+002) + J( 0.00000      )     ( 1.82481-001) + J( 0.00000      )     1.33204-001     2.22045-016
   (-1.00714+001) + J( 1.98371+000)       (-4.90675-001) + J(-3.69490+000)       2.72082+000    -9.75646+001
   (-1.00714+001) + J(-1.98371+000)       (-4.90675-001) + J( 3.69490+000)       2.72082+000     9.75646+001
   (-3.37406+000) + J( 0.00000      )     ( 6.26475-001) + J( 0.00000      )     4.57303-001     1.11022-016
   (-1.49428+000) + J( 0.00000      )     (-6.68045-002) + J( 0.00000      )     4.87648-002     1.80000+002

SENSITIVITY TO   1  2 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -1.12935+000

   .........POLE LOCATION..........       ..........................SENSITIVITY...........................
       REAL              IMAGINARY              REAL             IMAGINARY           MAGNITUDE        PHASE

   (-2.62414+002) + J( 0.00000      )     ( 1.32988-001) + J( 0.00000      )     1.50190-001     1.11022-016
   (-1.00714+001) + J( 1.98371+000)       (-2.51299-001) + J(-1.34340-001)       3.21812-001    -1.51872+002
   (-1.00714+001) + J(-1.98371+000)       (-2.51299-001) + J( 1.34340-001)       3.21812-001     1.51872+002
   (-3.37406+000) + J( 0.00000      )     (-8.33034-002) + J( 0.00000      )     9.40786-002     1.80000+002
   (-1.49428+000) + J( 0.00000      )     ( 4.94043-001) + J( 0.00000      )     5.57947-001     1.11022-016

SENSITIVITY TO   1  3 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -3.66976+000

   .........POLE LOCATION..........       ..........................SENSITIVITY...........................
       REAL              IMAGINARY              REAL             IMAGINARY           MAGNITUDE        PHASE

   (-2.62414+002) + J( 0.00000      )     ( 7.16328-004) + J( 0.00000      )     2.62875-003     2.22045-016
   (-1.00714+001) + J( 1.98371+000)       (-5.11862-004) + J(-2.35154-002)       8.63163-002    -9.12470+001
   (-1.00714+001) + J(-1.98371+000)       (-5.11862-004) + J( 2.35154-002)       8.63163-002     9.12470+001
   (-3.37406+000) + J( 0.00000      )     ( 4.09922-004) + J( 0.00000      )     1.50431-003     1.11022-016
   (-1.49428+000) + J( 0.00000      )     (-7.57326-004) + J( 0.00000      )     2.77920-003     1.80000+002
```

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SENSITIVITY TO   1  4 ELEMENT OF C      MATRIX:                  BASELINE PARAMETER VALUE = -3.47691-001

   .........POLE LOCATION..........        ...........................SENSITIVITY..................................
      REAL              IMAGINARY                REAL              IMAGINARY          MAGNITUDE           PHASE

   (-2.62414+002) + J( 0.00000     )      ( 7.10383-002) + J( 0.00000     )     2.46994-002        1.11022-016
   (-1.00714+001) + J( 1.98371+000)       ( 5.36682+000) + J( 5.45586+000)      2.66090+000        4.54714+001
   (-1.00714+001) + J(-1.98371+000)       ( 5.36682+000) + J(-5.45586+000)      2.66090+000       -4.54714+001
   (-3.37406+000) + J( 0.00000     )      (-3.80485-001) + J( 0.00000     )     1.32291-001        1.80000+002
   (-1.45428+000) + J( 0.00000     )      (-4.24195-001) + J( 0.00000     )     1.47489-001        1.80000+002

SENSITIVITY TO   1  5 ELEMENT OF C      MATRIX:                  BASELINE PARAMETER VALUE =  4.42773+000

   .........POLE LOCATION..........        ...........................SENSITIVITY..................................
      REAL              IMAGINARY                REAL              IMAGINARY          MAGNITUDE           PHASE

   (-2.62414+002) + J( 0.00000     )      (-3.34796-001) + J( 0.00000     )     1.48239+000        1.80000+002
   (-1.00714+001) + J( 1.98371+000)       ( 2.29307-002) + J(-2.83201-003)      1.02302-001       -7.04057+000
   (-1.00714+001) + J(-1.98371+000)       ( 2.29307-002) + J( 2.83201-003)      1.02302-001        7.04057+000
   (-3.37406+000) + J( 0.00000     )      (-4.44230-003) + J( 0.00000     )     1.96693-002        1.80000+002
   (-1.45428+000) + J( 0.00000     )      (-5.23498-004) + J( 0.00000     )     2.31791-003        1.80000+002

SENSITIVITY TO   2  1 ELEMENT OF C      MATRIX:                  BASELINE PARAMETER VALUE = -3.99878-004

   .........POLE LOCATION..........        ...........................SENSITIVITY..................................
      REAL              IMAGINARY                REAL              IMAGINARY          MAGNITUDE           PHASE

   (-2.62414+002) + J( 0.00000     )      ( 8.51774+001) + J( 0.00000     )     3.40606-002        1.11022-016
   (-1.00714+001) + J( 1.98371+000)       (-1.63655+003) + J( 1.34626+003)      8.47395-001        1.40559+002
   (-1.00714+001) + J(-1.98371+000)       (-1.63655+003) + J(-1.34626+003)      8.47395-001       -1.40559+002
   (-3.37406+000) + J( 0.00000     )      ( 2.87891+003) + J( 0.00000     )     1.15121+000        0.00000
   (-1.45428+000) + J( 0.00000     )      (-5.19831+001) + J( 0.00000     )     2.07869-002        1.80000+002
```

SENSITIVITY TO 2 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.18727-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62014+002)	+ J(0.00000)	(6.20755+001)	+ J(0.00000)	1.35776-003	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(1.05922+001)	+ J(1.61660+002)	3.54352-003	8.62513+001
(-1.00714+001)	+ J(-1.98371+000)	(1.05922+001)	+ J(-1.61660+002)	3.54352-003	-8.62513+001
(-3.37406+000)	+ J(0.00000)	(-3.82814+002)	+ J(0.00000)	8.37315-003	1.80000+002
(-1.48428+000)	+ J(0.00000)	(3.84434+002)	+ J(0.00000)	8.40859-003	1.11022-016

SENSITIVITY TO 2 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.36764-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62014+002)	+ J(0.00000)	(3.34364-001)	+ J(0.00000)	2.12911-002	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(-1.11994+001)	+ J(7.30747+000)	8.51518-001	1.46876+002
(-1.00714+001)	+ J(-1.98371+000)	(-1.11994+001)	+ J(-7.30747+000)	8.51518-001	-1.46876+002
(-3.37406+000)	+ J(0.00000)	(1.88376+000)	+ J(0.00000)	1.19951-001	1.11022-016
(-1.48428+000)	+ J(0.00000)	(-5.89304-001)	+ J(0.00000)	3.75248-002	1.80000+002

SENSITIVITY TO 2 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.81536-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62014+002)	+ J(0.00000)	(3.31589+001)	+ J(0.00000)	6.01953-004	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(1.02270+003)	+ J(-4.22915+003)	7.89872-002	-7.64056+001
(-1.00714+001)	+ J(-1.98371+000)	(1.02270+003)	+ J(4.22915+003)	7.89872-002	7.64056+001
(-3.37406+000)	+ J(0.00000)	(-1.74849+003)	+ J(0.00000)	3.17413-002	1.80000+002
(-1.48428+000)	+ J(0.00000)	(-3.30082+002)	+ J(0.00000)	5.99217-003	1.80000+002

```
SENSITIVITY TO   2  5 ELEMENT OF C       MATRIX:                     BASELINE PARAMETER VALUE =  1.31992-003

     .........POLE LOCATION..........      ..........................SENSITIVITY...............................
        REAL               IMAGINARY              REAL                IMAGINARY           MAGNITUDE          PHASE

     (-2.62414+002) + J( 0.00000    )      (-1.56274+002) + J( 0.00000    )      2.06270-001       1.80000+002
     (-1.00714+001) + J( 1.98371+000)      (-8.25206+000) + J(-1.02205+001)      1.73385-002      -1.28918+002
     (-1.00714+001) + J(-1.98371+000)      (-8.25206+000) + J( 1.02205+001)      1.73385-002       1.28918+002
     (-3.37405+000) + J( 0.00000    )      (-2.04142+001) + J( 0.00000    )      2.69451-002       1.80000+002
     (-1.48428+000) + J( 0.00000    )      (-4.07354-001) + J( 0.00000    )      5.37674-004       1.80000+002

SENSITIVITY TO   3  1 ELEMENT OF C       MATRIX:                     BASELINE PARAMETER VALUE =  8.98535-003

     .........POLE LOCATION..........      ..........................SENSITIVITY...............................
        REAL               IMAGINARY              REAL                IMAGINARY           MAGNITUDE          PHASE

     (-2.62414+002) + J( 0.00000    )      ( 6.94004+000) + J( 0.00000    )      6.23587-002       1.11022-016
     (-1.00714+001) + J( 1.98371+000)      ( 5.38814+000) + J( 6.11500-001)      7.55704-002       4.16952+000
     (-1.00714+001) + J(-1.98371+000)      ( 8.38814+000) + J(-6.11500-001)      7.55704-002      -4.16952+000
     (-3.37405+000) + J( 0.00000    )      (-5.02835+001) + J( 0.00000    )      4.51815-001       1.80000+002
     (-1.48428+000) + J( 0.00000    )      (-6.62815-001) + J( 0.00000    )      5.95562-003       1.80000+002

SENSITIVITY TO   3  2 ELEMENT OF C       MATRIX:                     BASELINE PARAMETER VALUE = -3.32910-003

     .........POLE LOCATION..........      ..........................SENSITIVITY...............................
        REAL               IMAGINARY              REAL                IMAGINARY           MAGNITUDE          PHASE

     (-2.62414+002) + J( 0.00000    )      ( 5.05775+000) + J( 0.00000    )      1.68378-002       1.11022-016
     (-1.00714+001) + J( 1.98371+000)      ( 4.12109-001) + J(-4.93537-001)      2.14052-003      -5.01378+001
     (-1.00714+001) + J(-1.98371+000)      ( 4.12109-001) + J( 4.93537-001)      2.14052-003       5.01378+001
     (-3.37406+000) + J( 0.00000    )      ( 6.68628+000) + J( 0.00000    )      2.22593-002       1.11022-016
     (-1.48428+000) + J( 0.00000    )      ( 4.90175+000) + J( 0.00000    )      1.63184-002       1.11022-016
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SENSITIVITY TO   3  3 ELEMENT OF C      MATRIX:                     BASELINE PARAMETER VALUE = -7.06987-001

  .........POLE LOCATION..........        ............................SENSITIVITY............................
     REAL              IMAGINARY                REAL               IMAGINARY          MAGNITUDE          PHASE

  (-2.62414+002) + J( 0.00000    )        ( 2.72431-002) + J( 0.00000    )        1.92605-002       2.22045-016
  (-1.00714+001) + J( 1.98371+000)        ( 5.21864-002) + J( 9.65999-003)        3.75219-002       1.04871+001
  (-1.00714+001) + J(-1.98371+000)        ( 5.21864-002) + J(-9.65999-003)        3.75219-002      -1.04871+001
  (-3.37406+000) + J( 0.00000    )        (-3.29021-002) + J( 0.00000    )        2.32613-002       1.80000+002
  (-1.48028+000) + J( 0.00000    )        (-7.51397-003) + J( 0.00000    )        5.31228-003       1.80000+002

SENSITIVITY TO   3  4 ELEMENT OF C      MATRIX:                     BASELINE PARAMETER VALUE =  7.80086-004

  .........POLE LOCATION..........        ............................SENSITIVITY............................
     REAL              IMAGINARY                REAL               IMAGINARY          MAGNITUDE          PHASE

  (-2.62414+002) + J( 0.00000    )        ( 2.70170+000) + J( 0.00000    )        2.10756-003       1.11022-016
  (-1.00714+001) + J( 1.98371+000)        (-1.45161+001) + J( 9.35307+000)        1.34708-002       1.47206+002
  (-1.00714+001) + J(-1.98371+000)        (-1.45161+001) + J(-9.35307+000)        1.34708-002       1.47206+002
  (-3.37406+000) + J( 0.00000    )        ( 3.05393+001) + J( 0.00000    )        2.38233-002       1.11022-016
  (-1.48028+000) + J( 0.00000    )        (-4.20873+000) + J( 0.00000    )        3.28317-003       1.80000+002

SENSITIVITY TO   3  5 ELEMENT OF C      MATRIX:                     BASELINE PARAMETER VALUE =  5.77986-002

  .........POLE LOCATION..........        ............................SENSITIVITY............................
     REAL              IMAGINARY                REAL               IMAGINARY          MAGNITUDE          PHASE

  (-2.62414+002) + J( 0.00000    )        (-1.27328+001) + J( 0.00000    )        7.35939-001       1.80000+002
  (-1.00714+001) + J( 1.98371+000)        (-4.26585-003) + J( 5.19593-002)        3.01328-003       9.46935+001
  (-1.00714+001) + J(-1.98371+000)        (-4.26585-003) + J(-5.19593-002)        3.01328-003      -9.46935+001
  (-3.37406+000) + J( 0.00000    )        ( 3.56558-001) + J( 0.00000    )        2.06085-002       1.11022-016
  (-1.48028+000) + J( 0.00000    )        (-5.19399-003) + J( 0.00000    )        3.00205-004       1.80000+002
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93/05K/0.9 OPTIMAL CONTROL DESIGN POINT HPG1

SYSTEMS CONTROL.INC.(VT) - TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 4 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -6.78373-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62914+002)	+ J(0.00000)	(-7.74999+000)	+ J(0.00000)	5.25739-003	1.80000+002
(-1.00714+001)	+ J(1.98371+000)	(-4.24489+000)	+ J(5.38597+000)	4.65207-003	1.28243+002
(-1.00714+001)	+ J(-1.98371+000)	(-4.24469+000)	+ J(-5.38597+000)	4.65207-003	-1.28243+002
(-3.37406+000)	+ J(0.00000)	(7.17624+000)	+ J(0.00000)	4.86817-003	1.11022-016
(-1.48428+000)	+ J(0.00000)	(1.06254+000)	+ J(0.00000)	7.20800-004	1.11022-016

SENSITIVITY TO 4 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 7.97656-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62914+002)	+ J(0.00000)	(-5.64803+000)	+ J(0.00000)	4.50518-002	1.80000+002
(-1.00714+001)	+ J(1.98371+000)	(1.45072-001)	+ J(5.03795-001)	4.18184-003	7.39358+001
(-1.00714+001)	+ J(-1.98371+000)	(1.45072-001)	+ J(-5.03795-001)	4.18184-003	-7.39358+001
(-3.37406+000)	+ J(0.00000)	(-9.54236-001)	+ J(0.00000)	7.61152-003	1.80000+002
(-1.48428+000)	+ J(0.00000)	(-7.85788+000)	+ J(0.00000)	6.26789-002	1.80000+002

SENSITIVITY TO 4 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.52613-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62914+002)	+ J(0.00000)	(-3.04226-002)	+ J(0.00000)	4.64288-003	1.80000+002
(-1.00714+001)	+ J(1.98371+000)	(-3.03642-002)	+ J(3.08336-002)	6.60428-003	1.34561+002
(-1.00714+001)	+ J(-1.98371+000)	(-3.03642-002)	+ J(-3.08336-002)	6.60428-003	-1.34561+002
(-3.37406+000)	+ J(0.00000)	(4.69564-003)	+ J(0.00000)	7.16614-004	1.11022-016
(-1.48428+000)	+ J(0.00000)	(1.20455-002)	+ J(0.00000)	1.83829-003	1.11022-016

SENSITIVITY TO 4 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.89765-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(-3.01701+000)	+ J(0.00000)	1.47763-003	1.80000+002
(-1.00714+001)	+ J(1.98371+000)	(3.14263-001)	+ J(-1.40768+001)	6.89606-003	-8.87212+001
(-1.00714+001)	+ J(-1.98371+000)	(3.14263-001)	+ J(1.40768+001)	6.89606-003	8.87212+001
(-3.37406+000)	+ J(0.00000)	(-4.35843+000)	+ J(0.00000)	2.13461-003	1.80000+002
(-1.48428+000)	+ J(0.00000)	(6.74692+000)	+ J(0.00000)	3.30441-003	1.11022-016

SENSITIVITY TO 4 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.58568-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(1.42188+001)	+ J(0.00000)	2.25466+000	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(-3.31443-002)	+ J(-2.66173-002)	6.74060-003	-1.41233+002
(-1.00714+001)	+ J(-1.98371+000)	(-3.31443-002)	+ J(2.66173-002)	6.74060-003	1.41233+002
(-3.37406+000)	+ J(0.00000)	(-5.08863-002)	+ J(0.00000)	8.06896-003	1.80000+002
(-1.48428+000)	+ J(0.00000)	(8.32637-003)	+ J(0.00000)	1.32030-003	1.11022-016

SENSITIVITY TO 5 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.02047-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(1.04520+004)	+ J(0.00000)	4.20221-001	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(-2.90037+003)	+ J(6.42601+003)	2.83452-001	1.14292+002
(-1.00714+001)	+ J(-1.98371+000)	(-2.90037+003)	+ J(-6.42601+003)	2.83452-001	-1.14292+002
(-3.37406+000)	+ J(0.00000)	(-2.01773+003)	+ J(0.00000)	8.11222-002	1.80000+002
(-1.48428+000)	+ J(0.00000)	(1.66423+002)	+ J(0.00000)	6.69099-003	1.11022-016

SENSITIVITY TO 5 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 5.86199-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(7.61722+003)	+ J(0.00000)	4.46521-001	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(2.69618+002)	+ J(4.66704+002)	3.15953-002	5.99848+001
(-1.00714+001)	+ J(-1.98371+000)	(2.69618+002)	+ J(-4.66704+002)	3.15953-002	-5.99848+001
(-3.37406+000)	+ J(0.00000)	(2.68301+002)	+ J(0.00000)	1.57278-002	0.00000
(-1.45428+000)	+ J(0.00000)	(-1.23076+003)	+ J(0.00000)	7.21470-002	1.80000+002

SENSITIVITY TO 5 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 9.10523-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(4.10295+001)	+ J(0.00000)	3.73583-001	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(-2.26535+001)	+ J(3.82904+001)	4.05089-001	1.20610+002
(-1.00714+001)	+ J(-1.98371+000)	(-2.26535+001)	+ J(-3.82904+001)	4.05089-001	-1.20610+002
(-3.37406+000)	+ J(0.00000)	(-1.32026+000)	+ J(0.00000)	1.20213-002	1.80000+002
(-1.45428+000)	+ J(0.00000)	(1.88665+000)	+ J(0.00000)	1.71784-002	1.11022-016

SENSITIVITY TO 5 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 3.92125-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(4.06890+003)	+ J(0.00000)	1.59552-001	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(-3.17555+003)	+ J(-1.41231+004)	5.67627-001	-1.02672+002
(-1.00714+001)	+ J(-1.98371+000)	(-3.17555+003)	+ J(1.41231+004)	5.67627-001	1.02672+002
(-3.37406+000)	+ J(0.00000)	(1.22545+003)	+ J(0.00000)	4.80531-002	1.11022-016
(-1.45428+000)	+ J(0.00000)	(1.05675+003)	+ J(0.00000)	4.14379-002	1.11022-016

B3/45K/0.9 OPTIMAL CONTROL DESIGN POINT HPG1

SYSTEMS CONTROL, INC. (VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 5 5 ELEMENT OF C MATRIX!

BASELINE PARAMETER VALUE = 4.53352-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62914+002)	+ J(0.00000)	(-1.41763+004)	+ J(0.00000)	8.69360+001	1.80000+002
(-1.00714+001)	+ J(1.98371+000)	(-3.96672+001)	+ J(-1.83422+001)	1.98127-001	1.55184+002
(-1.00714+001)	+ J(-1.98371+000)	(-3.96672+001)	+ J(1.83422+001)	1.98127-001	1.55184+002
(-3.37406+000)	+ J(0.00000)	(1.43076+001)	+ J(0.00000)	6.48638-002	1.11022-016
(-1.48428+000)	+ J(0.00000)	(1.30414+000)	+ J(0.00000)	5.91233-003	1.11022-016

SENSITIVITY OF OPTIMAL CONTROLLER DESIGN

SENSITIVITY TO 1 1 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 5.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(1.21148+001)	+ J(0.00000)	6.05740-003	2.22045-016
(-1.00714+001)	+ J(1.98371+000)	(-9.51982+001)	+ J(1.27137+003)	6.37463-001	9.42823+001
(-1.00714+001)	+ J(-1.98371+000)	(-9.51982+001)	+ J(-1.27137+003)	6.37463-001	-9.42823+001
(-3.37406+000)	+ J(0.00000)	(-2.43854+003)	+ J(0.00000)	1.21927+000	1.80000+002
(-1.48428+000)	+ J(0.00000)	(1.21081+002)	+ J(0.00000)	6.05403-002	1.11022-016

SENSITIVITY TO 2 2 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 5.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(-1.15460+001)	+ J(0.00000)	5.77299-003	1.80000+002
(-1.00714+001)	+ J(1.98371+000)	(2.64502+001)	+ J(3.04639+001)	2.01721-002	4.90340+001
(-1.00714+001)	+ J(-1.98371+000)	(2.64502+001)	+ J(-3.04639+001)	2.01721-002	-4.90340+001
(-3.37405+000)	+ J(0.00000)	(3.43784+001)	+ J(0.00000)	1.71892-002	1.11022-016
(-1.48428+000)	+ J(0.00000)	(-7.76224+002)	+ J(0.00000)	3.88112-001	1.80000+002

SENSITIVITY TO 3 3 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 5.00000-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(3.94237-004)	+ J(0.00000)	1.97118-004	2.22045-016
(-1.00714+001)	+ J(1.98371+000)	(-4.57295-002)	+ J(5.83756-002)	3.70773-002	1.28074+002
(-1.00714+001)	+ J(-1.98371+000)	(-4.57295-002)	+ J(-5.83756-002)	3.70773-002	-1.28074+002
(-3.37406+000)	+ J(0.00000)	(5.90178-003)	+ J(0.00000)	2.95089-003	1.11022-016
(-1.48428+000)	+ J(0.00000)	(1.29533-003)	+ J(0.00000)	6.47664-004	1.11022-016

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SENSITIVITY TO   4  4 ELEMENT OF A      MATRIX:                          BASELINE PARAMETER VALUE =  0.00000

     ..........POLE LOCATION..........      ..........................SENSITIVITY..............................
         REAL               IMAGINARY               REAL               IMAGINARY          MAGNITUDE        PHASE

     (-2.62414+002) + J( 0.00000     )      (-2.30791+001) + J( 0.00000     )      2.30791+001      1.80000+002
     (-1.00714+001) + J( 1.98371+000)       (-2.01939+004) + J(-2.39987+004)      3.13645+004     -1.30079+002
     (-1.00714+001) + J(-1.98371+000)       (-2.01939+004) + J( 2.39987+004)      3.13645+004      1.30079+002
     (-3.37406+000) + J( 0.00000     )      ( 1.50940+003) + J( 0.00000     )      1.50940+003      1.11022-016
     (-1.48428+000) + J( 0.00000     )      ( 1.98038+003) + J( 0.00000     )      1.98038+003      1.11022-016

SENSITIVITY TO   5  5 ELEMENT OF A      MATRIX:                          BASELINE PARAMETER VALUE =  1.00000+000

     ..........POLE LOCATION..........      ..........................SENSITIVITY..............................
         REAL               IMAGINARY               REAL               IMAGINARY          MAGNITUDE        PHASE

     (-2.62414+002) + J( 0.00000     )      (-7.47977+001) + J( 0.00000     )      7.47977+001      1.80000+002
     (-1.00714+001) + J( 1.98371+000)       (-4.87496-001) + J(-2.22679-001)      5.35946-001     -1.55450+002
     (-1.00714+001) + J(-1.98371+000)       (-4.87496-001) + J( 2.22679-001)      5.35946-001      1.55450+002
     (-3.37405+000) + J( 0.00000     )      (-6.07360-002) + J( 0.00000     )      6.07360-002      1.80000+002
     (-1.48428+000) + J( 0.00000     )      ( 1.04557-002) + J( 0.00000     )      1.04557-002      1.11022-016

SENSITIVITY TO   1  1 ELEMENT OF B      MATRIX:                          BASELINE PARAMETER VALUE =  1.00000-004

     ..........POLE LOCATION..........      ..........................SENSITIVITY..............................
         REAL               IMAGINARY               REAL               IMAGINARY          MAGNITUDE        PHASE

     (-2.62414+002) + J( 0.00000     )      ( 1.58711+004) + J( 0.00000     )      1.58711+000      1.11022-016
     (-1.00714+001) + J( 1.98371+000)       ( 9.08498+003) + J(-8.67024+003)      1.25583+000     -4.36619+001
     (-1.00714+001) + J(-1.98371+000)       ( 9.08498+003) + J( 8.67024+003)      1.25583+000      4.36619+001
     (-3.37405+000) + J( 0.00000     )      ( 1.33770+003) + J( 0.00000     )      1.33770-001      1.11022-016
     (-1.48428+000) + J( 0.00000     )      ( 1.93695+003) + J( 0.00000     )      1.93695-001      1.11022-016
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SENSITIVITY TO   2  2 ELEMENT OF B       MATRIX:                    BASELINE PARAMETER VALUE =  4.00000+002

   ..........POLE LOCATION...........        ..............................SENSITIVITY..............................
       REAL              IMAGINARY                  REAL             IMAGINARY            MAGNITUDE          PHASE

   (-2.62414+002) + J( 0.00000     )         ( 4.08554-004) + J( 0.00000     )        1.63421-001        1.11022-016
   (-1.00714+001) + J( 1.98371+000)          ( 1.02328-004) + J( 3.72230-004)         1.54415-001        7.46289+001
   (-1.00714+001) + J(-1.98371+000)          ( 1.02328-004) + J(-3.72230-004)         1.54415-001       -7.46289+001
   (-3.37406+000) + J( 0.00000     )         ( 2.13262-003) + J( 0.00000     )        8.53047-001        1.11022-016
   (-1.48428+000) + J( 0.00000     )         ( 5.72507-005) + J( 0.00000     )        2.29003-002        1.11022-016

SENSITIVITY TO   3  3 ELEMENT OF B       MATRIX:                    BASELINE PARAMETER VALUE =  5.00000-001

   ..........POLE LOCATION...........        ..............................SENSITIVITY..............................
       REAL              IMAGINARY                  REAL             IMAGINARY            MAGNITUDE          PHASE

   (-2.62414+002) + J( 0.00000     )         ( 1.17050+000) + J( 0.00000     )        5.85248-001        1.11022-016
   (-1.00714+001) + J( 1.98371+000)          (-6.29861-002) + J( 4.10432-002)         3.75892-002        1.46911+002
   (-1.00714+001) + J(-1.98371+000)          (-6.29861-002) + J(-4.10432-002)         3.75892-002       -1.46911+002
   (-3.37406+000) + J( 0.00000     )         ( 5.79492-001) + J( 0.00000     )        2.89746-001        1.11022-016
   (-1.48428+000) + J( 0.00000     )         ( 7.14172-002) + J( 0.00000     )        3.57086-002        1.11022-016

SENSITIVITY TO   4  4 ELEMENT OF B       MATRIX:                    BASELINE PARAMETER VALUE =  2.00000-001

   ..........POLE LOCATION...........        ..............................SENSITIVITY..............................
       REAL              IMAGINARY                  REAL             IMAGINARY            MAGNITUDE          PHASE

   (-2.62414+002) + J( 0.00000     )         ( 9.49813+000) + J( 0.00000     )        1.89963+000        1.11022-016
   (-1.00714+001) + J( 1.98371+000)          (-1.11330-001) + J(-3.67397-002)         2.34470-002       -1.61737+002
   (-1.00714+001) + J(-1.98371+000)          (-1.11330-001) + J( 3.67397-002)         2.34470-002        1.61737+002
   (-3.37406+000) + J( 0.00000     )         ( 1.57683-002) + J( 0.00000     )        3.15365-003        1.11022-016
   (-1.48428+000) + J( 0.00000     )         ( 3.24799-001) + J( 0.00000     )        6.49598-002        1.11022-016
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SENSITIVITY TO 5 5 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000+004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.62414+002)	+ J(0.00000)	(7.05693-003)	+ J(0.00000)	7.05693+001	1.11022-016
(-1.00714+001)	+ J(1.98371+000)	(-3.50881-005)	+ J(2.47488-005)	4.29381-001	1.44804+002
(-1.00714+001)	+ J(-1.98371+000)	(-3.50881-005)	+ J(-2.47488-005)	4.29381-001	1.44804+002
(-3.37406+000)	+ J(0.00000)	(-1.97220-006)	+ J(0.00000)	1.97220-002	1.80000+002
(-1.43428+000)	+ J(0.00000)	(-7.63365-008)	+ J(0.00000)	7.63365-004	1.80000+002

! SENSITIVITY OF CLOSED LOOP SYSTEM !

SENSITIVITY TO 1 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -5.15255-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(-1.05138-001)	+ J(0.00000)	5.41728-003	1.80000+002
(-1.37052+001)	+ J(3.84489+000)	(3.63755-002)	+ J(-6.02711-001)	3.11115-002	-8.65463+001
(-1.37052+001)	+ J(-3.84489+000)	(3.63755-002)	+ J(6.02711-001)	3.11115-002	8.65463+001
(-3.47935+000)	+ J(7.81584-001)	(8.79339-003)	+ J(-5.94506-001)	3.06356-002	-8.91527+001
(-3.47935+000)	+ J(-7.81584-001)	(8.79339-003)	+ J(5.94506-001)	3.06356-002	8.91527+001

SENSITIVITY TO 1 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.71175+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(-1.54415-002)	+ J(0.00000)	2.64320-002	1.80000+002
(-1.37052+001)	+ J(3.84489+000)	(-5.50080-001)	+ J(-8.32520-001)	1.70805+000	-1.23454+002
(-1.37052+001)	+ J(-3.84489+000)	(-5.50080-001)	+ J(8.32520-001)	1.70805+000	1.23454+002
(-3.47935+000)	+ J(7.81584-001)	(3.21450-001)	+ J(3.49527-002)	5.53486-001	6.20565+000
(-3.47935+000)	+ J(-7.81584-001)	(3.21450-001)	+ J(-3.49527-002)	5.53486-001	-6.20565+000

SENSITIVITY TO 1 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.35734+001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(6.14276-005)	+ J(0.00000)	2.67661-003	1.11022-016
(-1.37052+001)	+ J(3.84489+000)	(-1.58525-003)	+ J(-2.13610-002)	9.33332-001	-9.42443+001
(-1.37052+001)	+ J(-3.84489+000)	(-1.58525-003)	+ J(2.13610-002)	9.33332-001	9.42443+001
(-3.47935+000)	+ J(7.81584-001)	(-6.98968-004)	+ J(-1.55158-003)	7.41511-002	-1.14251+002
(-3.47935+000)	+ J(-7.81584-001)	(-6.98965-004)	+ J(1.55158-003)	7.41511-002	1.14251+002

SENSITIVITY TO 1 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -6.42553-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(2.93301-002)	+ J(0.00000)	1.88462-002	1.11022-016
(-1.37052+001)	+ J(3.84489+000)	(5.38051+000)	+ J(1.41840+000)	3.57544+000	1.47679+001
(-1.37052+001)	+ J(-3.84489+000)	(5.38051+000)	+ J(-1.41840+000)	3.57544+000	-1.47679+001
(-3.47735+000)	+ J(7.81584-001)	(-3.95278-001)	+ J(4.53622-002)	2.55654-001	1.73454+002
(-3.47735+000)	+ J(-7.81584-001)	(-3.95278-001)	+ J(-4.53622-002)	2.55654-001	-1.73454+002

SENSITIVITY TO 1 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.09034+001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(1.40624-001)	+ J(0.00000)	1.53329+000	1.11022-016
(-1.37052+001)	+ J(3.84489+000)	(8.34271-003)	+ J(-6.20099-003)	1.13340-001	-3.66228+001
(-1.37052+001)	+ J(-3.84489+000)	(8.34271-003)	+ J(6.20099-003)	1.13340-001	3.66228+001
(-3.47735+000)	+ J(7.81584-001)	(-4.54883-004)	+ J(9.70083-004)	1.16824-002	1.15123+002
(-3.47735+000)	+ J(-7.81584-001)	(-4.54883-004)	+ J(-9.70083-004)	1.16824-002	-1.15123+002

SENSITIVITY TO 2 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.38759-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(9.28425+002)	+ J(0.00000)	3.14512-001	1.11022-016
(-1.37052+001)	+ J(3.84489+000)	(-7.17903+002)	+ J(-3.05402+001)	2.43416-001	-1.77564+002
(-1.37052+001)	+ J(-3.84489+000)	(-7.17903+002)	+ J(3.05402+001)	2.43416-001	1.77564+002
(-3.47735+000)	+ J(7.81584-001)	(6.06141+002)	+ J(-2.09796+003)	7.39771-001	-7.38851+001
(-3.47735+000)	+ J(-7.81584-001)	(6.06141+002)	+ J(2.09796+003)	7.39771-001	7.38851+001

SENSITIVITY TO 2 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.31993-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.23243+002)	+ J(0.00000)	(1.36357+002)	+ J(0.00000)	3.16339-002	1.11022-016
(-1.37052+001)	+ J(3.84489+000)	(-9.78943+002)	+ J(6.72110+002)	2.75482-001	1.45528+002
(-1.37052+001)	+ J(-3.84489+000)	(-9.78943+002)	+ J(-6.72110+002)	2.75482-001	-1.45528+002
(-3.47935+000)	+ J(7.81584-001)	(1.10516+003)	+ J(4.34740+002)	2.75514-001	2.14733+001
(-3.47935+000)	+ J(-7.81584-001)	(1.10516+003)	+ J(-4.34740+002)	2.75514-001	-2.14733+001

SENSITIVITY TO 2 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 3.32496-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.23243+002)	+ J(0.00000)	(-5.42439-001)	+ J(0.00000)	1.80359-002	1.80000+002
(-1.37052+001)	+ J(3.84489+000)	(-2.53828+001)	+ J(2.33776+000)	8.47539-001	1.74738+002
(-1.37052+001)	+ J(-3.84489+000)	(-2.53828+001)	+ J(-2.33776+000)	8.47539-001	-1.74738+002
(-3.47935+000)	+ J(7.81584-001)	(-9.75965-001)	+ J(-6.17360+000)	2.07819-001	-9.89834+001
(-3.47935+000)	+ J(-7.81584-001)	(-9.75965-001)	+ J(6.17360+000)	2.07819-001	9.89834+001

SENSITIVITY TO 2 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 5.12409-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.23243+002)	+ J(0.00000)	(-2.59001+002)	+ J(0.00000)	1.32715-002	1.80000+002
(-1.37052+001)	+ J(3.84489+000)	(1.57393+003)	+ J(-6.43209+003)	3.39310-001	-7.62500+001
(-1.37052+001)	+ J(-3.84489+000)	(1.57393+003)	+ J(6.43209+003)	3.39310-001	7.62500+001
(-3.47935+000)	+ J(7.81584-001)	(-1.44443+003)	+ J(-2.21570+002)	7.48796-002	-1.71279+002
(-3.47935+000)	+ J(-7.81584-001)	(-1.44443+003)	+ J(2.21570+002)	7.48796-002	1.71279+002

SENSITIVITY TO 2 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.78179-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(-1.24179+003)	+ J(0.00000)	8.42156+000	1.80000+002
(-1.37062+001)	+ J(3.84489+000)	(-7.55459+000)	+ J(-9.79546+000)	8.38924-002	-1.27641+002
(-1.37062+001)	+ J(-3.84489+000)	(-7.55459+000)	+ J(9.79546+000)	8.38924-002	1.27641+002
(-3.47935+000)	+ J(7.81584-001)	(-2.54998+000)	+ J(2.99727+000)	2.66879-002	1.30390+002
(-3.47935+000)	+ J(-7.81584-001)	(-2.54998+000)	+ J(-2.99727+000)	2.66879-002	-1.30390+002

SENSITIVITY TO 3 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.02145-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(3.78845+001)	+ J(0.00000)	3.86971-001	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(4.40637+000)	+ J(-3.33809-001)	4.51379-002	-4.33223+000
(-1.37062+001)	+ J(-3.84489+000)	(4.40637+000)	+ J(3.33809-001)	4.51379-002	4.33223+000
(-3.47935+000)	+ J(7.81584-001)	(-2.97786+001)	+ J(1.15580+001)	3.26282-001	1.58787+002
(-3.47935+000)	+ J(-7.81584-001)	(-2.97786+001)	+ J(-1.15580+001)	3.26282-001	-1.58787+002

SENSITIVITY TO 3 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.39125-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(5.56407+000)	+ J(0.00000)	2.44332-002	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(5.49128+000)	+ J(-4.81409+000)	3.20680-002	-4.12404+001
(-1.37062+001)	+ J(-3.84489+000)	(5.49128+000)	+ J(4.81409+000)	3.20680-002	4.12404+001
(-3.47935+000)	+ J(7.81584-001)	(-4.74581+000)	+ J(-1.67107+001)	7.62826-002	-1.05855+002
(-3.47935+000)	+ J(-7.81584-001)	(-4.74581+000)	+ J(1.67107+001)	7.62826-002	1.05855+002

SENSITIVITY TO 3 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.46491-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-5.29249+002)	+ J(0.00000)	(-2.21343-002)	+ J(0.00000)	3.24247-003	1.80000+002
(-1.37052+001)	+ J(3.84459+000)	(1.53319-001)	+ J(-3.26736-002)	2.29641-002	-1.20303+001
(-1.37052+001)	+ J(-3.84459+000)	(1.53319-001)	+ J(3.26736-002)	2.29641-002	1.20303+001
(-3.47935+000)	+ J(7.81554-001)	(-6.31515-002)	+ J(6.61099-002)	1.33930-002	1.33689+002
(-3.47935+000)	+ J(-7.81554-001)	(-6.31515-002)	+ J(-6.61099-002)	1.33930-002	-1.33689+002

SENSITIVITY TO 3 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.12603-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-5.29249+002)	+ J(0.00000)	(-1.05686+001)	+ J(0.00000)	1.19005-002	1.80000+002
(-1.37052+001)	+ J(3.84459+000)	(-4.95018+000)	+ J(4.04216+001)	4.58559-002	9.69820+001
(-1.37052+001)	+ J(-3.84459+000)	(-4.95018+000)	+ J(-4.04216+001)	4.58559-002	-9.69820+001
(-3.47935+000)	+ J(7.81554-001)	(1.02345+001)	+ J(1.87661+001)	2.40694-002	6.13933+001
(-3.47935+000)	+ J(-7.81554-001)	(1.02345+001)	+ J(-1.87661+001)	2.40694-002	-6.13933+001

SENSITIVITY TO 3 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.78028-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-5.29249+002)	+ J(0.00000)	(-5.06714+001)	+ J(0.00000)	1.40881+001	1.80000+002
(-1.37052+001)	+ J(3.84459+000)	(5.32354-002)	+ J(5.43456-002)	2.11510-002	4.55913+001
(-1.37052+001)	+ J(-3.84459+000)	(5.32354-002)	+ J(-5.43456-002)	2.11510-002	-4.55913+001
(-3.47935+000)	+ J(7.81554-001)	(5.74802-002)	+ J(3.07506-003)	1.60039-002	3.06228+000
(-3.47935+000)	+ J(-7.81554-001)	(5.74802-002)	+ J(-3.07506-003)	1.60039-002	-3.06228+000

SENSITIVITY TO 4 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.97613-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(3.41994+000)	+ J(0.00000)	1.70181-003	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(-1.08946+001)	+ J(-5.22353+001)	2.65523-002	-1.01781+002
(-1.37062+001)	+ J(-3.84489+000)	(-1.08946+001)	+ J(5.22353+001)	2.65523-002	1.01781+002
(-3.47935+000)	+ J(7.81584-001)	(9.18464+000)	+ J(-1.20176+001)	7.52666-003	-5.26107+001
(-3.47935+000)	+ J(-7.81584-001)	(9.18464+000)	+ J(1.20176+001)	7.52666-003	5.26107+001

SENSITIVITY TO 4 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.09199-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(1.63970+001)	+ J(0.00000)	1.79053+000	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(-8.89510-002)	+ J(-4.49873-002)	1.08849-002	-1.53172+002
(-1.37062+001)	+ J(-3.84489+000)	(-8.89510-002)	+ J(4.49873-002)	1.08849-002	1.53172+002
(-3.47935+000)	+ J(7.81584-001)	(-1.45582-002)	+ J(-3.80412-002)	4.44785-003	-1.10942+002
(-3.47935+000)	+ J(-7.81584-001)	(-1.45582-002)	+ J(3.80412-002)	4.44785-003	1.10942+002

SENSITIVITY TO 5 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.18115-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(4.90832+004)	+ J(0.00000)	1.07058+000	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(-1.32628+003)	+ J(-2.81648+002)	2.95732-002	-1.68011+002
(-1.37062+001)	+ J(-3.84489+000)	(-1.32628+003)	+ J(2.81648+002)	2.95732-002	1.68011+002
(-3.47935+000)	+ J(7.81584-001)	(7.34664+002)	+ J(2.96350+003)	6.65949-002	7.60769+001
(-3.47935+000)	+ J(-7.81584-001)	(7.34664+002)	+ J(-2.96350+003)	6.65949-002	-7.60769+001

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SYSTEMS CONTROL,INC.(VT) - TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 5 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.42427-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(-6.56500+004)	+ J(0.00000)	2.90454+002	1.80000+002
(-1.37652+001)	+ J(3.84449+000)	(-1.09897+001)	+ J(-2.05928+001)	1.03270-001	-1.18087+002
(-1.37652+001)	+ J(-3.84449+000)	(-1.09897+001)	+ J(2.05928+001)	1.03270-001	1.18087+002
(-3.47235+000)	+ J(7.81554-001)	(9.85663-001)	+ J(-5.41243+000)	2.43423-002	-7.96482+001
(-3.47235+000)	+ J(-7.81554-001)	(9.85663-001)	+ J(5.41243+000)	2.43423-002	7.96482+001

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SENSITIVITY TO   4 . 4 ELEMENT OF A      MATRIX:                    BASELINE PARAMETER VALUE =  0.00000

   .........POLE LOCATION..........        ..........................SENSITIVITY...............................
      REAL              IMAGINARY                 REAL              IMAGINARY          MAGNITUDE             PHASE

   (-5.29249+002) + J( 0.00000     )       (-3.02044+000) + J( 0.00000     )       3.02044+000       1.80000+002
   (-1.37062+001) + J( 3.84489+000)        (-1.67971+004) + J(-6.35134+003)        1.79578+004      -1.59287+002
   (-1.37062+001) + J(-3.84489+000)        (-1.67971+004) + J( 6.35134+003)        1.79578+004       1.59287+002
   (-3.47935+000) + J( 7.81584-001)        ( 1.60437+003) + J(-1.77814+002)        1.61420+003      -6.32432+000
   (-3.47935+000) + J(-7.81584-001)        ( 1.60437+003) + J( 1.77814+002)        1.61420+003       6.32432+000

SENSITIVITY TO   5  5 ELEMENT OF A       MATRIX:                    BASELINE PARAMETER VALUE =  4.00000+000

   .........POLE LOCATION..........        ..........................SENSITIVITY...............................
      REAL              IMAGINARY                 REAL              IMAGINARY          MAGNITUDE             PHASE

   (-5.29249+002) + J( 0.00000     )       (-5.53718+001) + J( 0.00000     )       2.21487+002       1.80000+002
   (-1.37062+001) + J( 3.84489+000)        (-1.06967-001) + J(-1.05873-002)        4.29957-001      -1.74348+002
   (-1.37062+001) + J(-3.84489+000)        (-1.06967-001) + J( 1.05873-002)        4.29957-001       1.74348+002
   (-3.47935+000) + J( 7.81584-001)        ( 2.00754-003) + J(-7.76148-003)        3.20676-002      -7.54981+001
   (-3.47935+000) + J(-7.81584-001)        ( 2.00754-003) + J( 7.76148-003)        3.20676-002       7.54981+001

SENSITIVITY TO   1  1 ELEMENT OF B       MATRIX:                    BASELINE PARAMETER VALUE =  1.00000-004

   .........POLE LOCATION..........        ..........................SENSITIVITY...............................
      REAL              IMAGINARY                 REAL              IMAGINARY          MAGNITUDE             PHASE

   (-5.29249+002) + J( 0.00000     )       ( 8.45819+003) + J( 0.00000     )       8.45819-001       1.11022-016
   (-1.37062+001) + J( 3.84489+000)        ( 1.89706+004) + J(-1.30638+004)        2.30336+000      -3.45526+001
   (-1.37062+001) + J(-3.84489+000)        ( 1.89706+004) + J( 1.30638+004)        2.30336+000       3.45526+001
   (-3.47935+000) + J( 7.81584-001)        ( 1.42976+003) + J(-7.01223+001)        1.43148-001      -2.80780+000
   (-3.47935+000) + J(-7.81584-001)        ( 1.42976+003) + J( 7.01223+001)        1.43148-001       2.80780+000
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SENSITIVITY TO 2 2 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000+003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(6.00167-003)	+ J(0.00000)	6.00167+000	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(2.36910-004)	+ J(4.43534-004)	5.02841-001	6.18915+001
(-1.37062+001)	+ J(-3.84489+000)	(2.36910-004)	+ J(-4.43534-004)	5.02841-001	-6.18915+001
(-3.47935+000)	+ J(7.81584-001)	(4.42286-004)	+ J(-3.78307-004)	5.82007-001	-4.05419+001
(-3.47935+000)	+ J(-7.81584-001)	(4.42286-004)	+ J(3.78307-004)	5.82007-001	4.05419+001

SENSITIVITY TO 3 3 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(9.62242+000)	+ J(0.00000)	9.62242+000	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(-1.15249-001)	+ J(-1.20869-003)	1.15255-001	-1.79399+002
(-1.37062+001)	+ J(-3.84489+000)	(-1.15249-001)	+ J(1.20869-003)	1.15255-001	1.79399+002
(-3.47935+000)	+ J(7.81584-001)	(2.12671-001)	+ J(5.43611-002)	2.19509-001	1.43384+001
(-3.47935+000)	+ J(-7.81584-001)	(2.12671-001)	+ J(-5.43611-002)	2.19509-001	-1.43384+001

SENSITIVITY TO 4 4 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 8.00000-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.29249+002)	+ J(0.00000)	(1.54773+000)	+ J(0.00000)	1.23818+000	1.11022-016
(-1.37062+001)	+ J(3.84489+000)	(-7.19700-004)	+ J(-1.31961-002)	1.05725-002	-9.31218+001
(-1.37062+001)	+ J(-3.84489+000)	(-7.19700-004)	+ J(1.31961-002)	1.05725-002	9.31218+001
(-3.47935+000)	+ J(7.81584-001)	(1.35798-001)	+ J(6.11160-002)	1.19134-001	2.42301+001
(-3.47935+000)	+ J(-7.81584-001)	(1.35798-001)	+ J(-6.11160-002)	1.19134-001	-2.42301+001

83/30K/0.9 OPTIMAL CONTROL DESIGN POINT HPG2

SYSTEMS CONTROL.INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 5 5 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 8.00000+004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-5.23249+002)	+ J(0.00000)	(2.54783-003)	+ J(0.00000)	2.03826+002	1.11022-016
(-1.37062+001)	+ J(3.84459+000)	(-1.88957-005)	+ J(9.55428-006)	1.69391+000	1.53177+002
(-1.37062+001)	+ J(-3.84459+000)	(-1.88957-005)	+ J(-9.55428-006)	1.69391+000	-1.53177+002
(-3.47935+000)	+ J(7.81584-001)	(-9.85492-008)	+ J(-9.47008-007)	7.61698-002	-9.59411+001
(-3.47935+000)	+ J(-7.81554-001)	(-9.85492-008)	+ J(9.47008-007)	7.61698-002	9.59411+001

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+-------------------------------------+
!  SENSITIVITY OF CLOSED LOOP SYSTEM  !
+-------------------------------------+

SENSITIVITY TO   1  1 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -5.10654-001

   .........POLE LOCATION..........        ...........................SENSITIVITY.............................
        REAL            IMAGINARY                 REAL              IMAGINARY         MAGNITUDE        PHASE

   (-3.49854+002) + J( 0.00000     )       ( 7.98152-002) + J( 0.00000     )       4.07579-002      1.11022-016
   (-1.00200+001) + J( 2.96341+000)        ( 1.93198-001) + J(-1.82093+000)        9.35083-001     -8.39437+001
   (-1.00200+001) + J(-2.96341+000)        ( 1.93198-001) + J( 1.82093+000)        9.35083-001      8.39437+001
   (-1.05634+001) + J( 0.00000     )       (-6.99481-001) + J( 0.00000     )       3.57193-001      1.80000+002
   (-6.13391+000) + J( 0.00000     )       ( 2.47589-001) + J( 0.00000     )       1.26432-001      1.11022-016

SENSITIVITY TO   1  2 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -1.94638+000

   .........POLE LOCATION..........        ...........................SENSITIVITY.............................
        REAL            IMAGINARY                 REAL              IMAGINARY         MAGNITUDE        PHASE

   (-3.49854+002) + J( 0.00000     )       ( 3.95938-002) + J( 0.00000     )       7.70647-002      1.11022-016
   (-1.00200+001) + J( 2.96341+000)        (-2.17297-001) + J(-2.86713-001)        7.00217-001     -1.27158+002
   (-1.00200+001) + J(-2.96341+000)        (-2.17297-001) + J( 2.86713-001)        7.00217-001      1.27158+002
   (-1.05634+001) + J( 0.00000     )       (-1.49016-001) + J( 0.00000     )       2.90042-001      1.80000+002
   (-6.13391+000) + J( 0.00000     )       ( 8.31117-001) + J( 0.00000     )       1.61767+000      1.11022-016

SENSITIVITY TO   1  3 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -3.00513+001

   .........POLE LOCATION..........        ...........................SENSITIVITY.............................
        REAL            IMAGINARY                 REAL              IMAGINARY         MAGNITUDE        PHASE

   (-3.49854+002) + J( 0.00000     )       ( 2.19037-004) + J( 0.00000     )       6.58233-003      2.22045-016
   (-1.00200+001) + J( 2.96341+000)        ( 1.95160-004) + J(-1.33938-002)        4.02545-001     -8.91653+001
   (-1.00200+001) + J(-2.96341+000)        ( 1.95160-004) + J( 1.33938-002)        4.02545-001      8.91653+001
   (-1.05634+001) + J( 0.00000     )       ( 5.49572-005) + J( 0.00000     )       1.65153-003      1.11022-016
   (-6.13391+000) + J( 0.00000     )       (-3.13331-003) + J( 0.00000     )       9.41601-002      1.80000+002
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SENSITIVITY TO 1 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.40679-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(1.59587-002)	+ J(0.00000)	3.84093-003	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(4.39244+000)	+ J(2.42695+000)	1.20781+000	2.89220+001
(-1.00200+001)	+ J(-2.96341+000)	(4.39244+000)	+ J(-2.42695+000)	1.20781+000	-2.89220+001
(-1.05634+001)	+ J(0.00000)	(3.83773+000)	+ J(0.00000)	9.23662-001	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-2.63857+000)	+ J(0.00000)	6.35050-001	1.80000+002

SENSITIVITY TO 1 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.85502+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-1.45049-001)	+ J(0.00000)	4.14117-001	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(3.77374-003)	+ J(-3.32320-003)	1.43562-002	-4.13675+001
(-1.00200+001)	+ J(-2.96341+000)	(3.77374-003)	+ J(3.32320-003)	1.43562-002	4.13675+001
(-1.05634+001)	+ J(0.00000)	(8.22401-003)	+ J(0.00000)	2.34797-002	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-1.82299-003)	+ J(0.00000)	5.20467-003	1.80000+002

SENSITIVITY TO 2 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.90720-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-2.37805+002)	+ J(0.00000)	4.53541-002	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-5.27256+003)	+ J(-1.00375+004)	2.16240+000	-1.17712+002
(-1.00200+001)	+ J(-2.96341+000)	(-5.27256+003)	+ J(1.00375+004)	2.16240+000	1.17712+002
(-1.05634+001)	+ J(0.00000)	(9.52568+003)	+ J(0.00000)	1.81674+000	1.11022-016
(-6.13391+000)	+ J(0.00000)	(9.01947+002)	+ J(0.00000)	1.72019-001	1.11022-016

SENSITIVITY TO 2 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.56350-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-1.17967+002)	+ J(0.00000)	5.38344-003	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-2.10523+003)	+ J(-7.27898+002)	1.01653-001	1.60927+002
(-1.00200+001)	+ J(-2.96341+000)	(-2.10523+003)	+ J(7.27898+002)	1.01653-001	1.60927+002
(-1.06634+001)	+ J(0.00000)	(2.02933+003)	+ J(0.00000)	9.26086-002	1.11022-016
(-6.13391+000)	+ J(0.00000)	(3.02769+003)	+ J(0.00000)	1.38168-001	1.11022-016

SENSITIVITY TO 2 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 3.71416-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-6.52607-001)	+ J(0.00000)	2.42388-002	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-4.50923+001)	+ J(-6.96119+001)	3.08054+000	1.22934+002
(-1.00200+001)	+ J(-2.96341+000)	(-4.50923+001)	+ J(6.96119+001)	3.08054+000	1.22934+002
(-1.05634+001)	+ J(0.00000)	(-7.48418-001)	+ J(0.00000)	2.77974-002	1.80000+002
(-6.13391+000)	+ J(0.00000)	(-1.14144+001)	+ J(0.00000)	4.23949-001	1.80000+002

SENSITIVITY TO 2 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.05994-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-4.75481+001)	+ J(0.00000)	9.79461-004	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(3.09613+004)	+ J(-2.62530+003)	6.40073-001	4.84668+000
(-1.00200+001)	+ J(-2.96341+000)	(3.09613+004)	+ J(2.62530+003)	6.40073-001	4.84668+000
(-1.05634+001)	+ J(0.00000)	(-5.22630+004)	+ J(0.00000)	1.07659+000	1.80000+002
(-6.13391+000)	+ J(0.00000)	(-9.61211+003)	+ J(0.00000)	1.98003-001	1.80000+002

SENSITIVITY TO 2 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.16609-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
-3.49854+002	0.00000	4.32164+002	0.00000	1.36827-001	1.11022-016
-1.00200+001	2.96341+000	7.98680+000	-3.00929+001	9.85754-003	-7.51362+001
-1.00200+001	-2.96341+000	7.98680+000	3.00929+001	9.85754-003	7.51362+001
-1.05634+001	0.00000	-1.11996+002	0.00000	3.54590-002	1.80000+002
-6.13391+000	0.00000	-6.64099+000	0.00000	2.10259-003	1.80000+002

SENSITIVITY TO 3 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.11540-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
-3.49854+002	0.00000	1.45257+001	0.00000	8.88303-002	1.11022-016
-1.00200+001	2.96341+000	2.47530+001	1.67108+002	1.03308+000	8.15744+001
-1.00200+001	-2.96341+000	2.47530+001	-1.67108+002	1.03308+000	-8.15744+001
-1.05634+001	0.00000	-1.63292+002	0.00000	9.98597-001	1.80000+002
-6.13391+000	0.00000	2.00517-001	0.00000	1.22624-003	1.11022-016

SENSITIVITY TO 3 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -9.05701-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
-3.49854+002	0.00000	7.20573+000	0.00000	6.52624-003	1.11022-016
-1.00200+001	2.96341+000	2.60243+001	2.05969+001	3.00591-002	3.83598+001
-1.00200+001	-2.96341+000	2.60243+001	-2.05969+001	3.00591-002	-3.83598+001
-1.05634+001	0.00000	-3.47875+001	0.00000	3.15070-002	1.80000+002
-6.13391+000	0.00000	6.73101-001	0.00000	6.09629-004	0.00000

SENSITIVITY TO 3 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.57681-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49654+002)	+ J(0.00000)	(3.98628-002)	+ J(0.00000)	1.42582-002	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(2.91573-001)	+ J(1.20088+000)	4.42012-001	7.63528+001
(-1.00200+001)	+ J(-2.96341+000)	(2.91573-001)	+ J(-1.20088+000)	4.42012-001	7.63528+001
(-1.05634+001)	+ J(0.00000)	(1.28296-002)	+ J(0.00000)	4.58891-003	2.22045-016
(-6.13391+000)	+ J(0.00000)	(-2.53759-003)	+ J(0.00000)	9.07649-004	1.80000+002

SENSITIVITY TO 3 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 8.89014-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49654+002)	+ J(0.00000)	(2.90435+000)	+ J(0.00000)	2.58201-004	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-4.48338+002)	+ J(-1.15446+002)	4.11581-002	1.65560+002
(-1.00200+001)	+ J(-2.96341+000)	(-4.48338+002)	+ J(1.15446+002)	4.11581-002	1.65560+002
(-1.05634+001)	+ J(0.00000)	(8.95908+002)	+ J(0.00000)	7.96475-002	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-2.13692+000)	+ J(0.00000)	1.89975-004	1.80000+002

SENSITIVITY TO 3 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.60516-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49654+002)	+ J(0.00000)	(-2.63976+001)	+ J(0.00000)	1.21565+000	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-2.60414-001)	+ J(3.83901-001)	2.13629-002	1.24151+002
(-1.00200+001)	+ J(-2.96341+000)	(-2.60414-001)	+ J(-3.83901-001)	2.13629-002	1.24151+002
(-1.05634+001)	+ J(0.00000)	(1.91987+000)	+ J(0.00000)	8.84132-002	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-1.47639-003)	+ J(0.00000)	6.79902-005	1.80000+002

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83/06/0   OPTIMAL CONTROL DESIGN POINT   HPG3                          SYSTEMS CONTROL.INC.(VT) -
                                                                        TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO   4  1 ELEMENT OF C      MATRIX:                  BASELINE PARAMETER VALUE = -4.83116-004

  .........POLE LOCATION..........     ............................SENSITIVITY..............................
      REAL              IMAGINARY               REAL             IMAGINARY          MAGNITUDE          PHASE

  (-3.49854+002) + J( 0.00000     )    (-3.48281+001) + J( 0.00000     )    1.68260-002     1.80000+002
  (-1.00200+001) + J( 2.96341+000)     (-2.23067+001) + J(-4.77772+001)     2.54738-002    -1.15027+002
  (-1.00200+001) + J(-2.96341+000)     (-2.23067+001) + J( 4.77772+001)     2.54738-002     1.15027+002
  (-1.05634+001) + J( 0.00000     )    ( 7.73030+001) + J( 0.00000     )    3.73463-002     1.11022-016
  (-6.13391+000) + J( 0.00000     )    (-1.33516+001) + J( 0.00000     )    6.45037-003     1.80000+002

SENSITIVITY TO   4  2 ELEMENT OF C      MATRIX:                  BASELINE PARAMETER VALUE =  7.24900-003

  .........POLE LOCATION..........     ............................SENSITIVITY..............................
      REAL              IMAGINARY               REAL             IMAGINARY          MAGNITUDE          PHASE

  (-3.49854+002) + J( 0.00000     )    (-1.72771+001) + J( 0.00000     )    1.25242-001     1.80000+002
  (-1.00200+001) + J( 2.96341+000)     (-9.62110+000) + J(-3.84000+000)     7.50932-002    -1.58242+002
  (-1.00200+001) + J(-2.96341+000)     (-9.62110+000) + J( 3.84000+000)     7.50932-002     1.58242+002
  (-1.05634+001) + J( 0.00000     )    ( 1.64685+001) + J( 0.00000     )    1.19380-001     1.11022-016
  (-6.13391+000) + J( 0.00000     )    (-4.48192+001) + J( 0.00000     )    3.24894-001     1.80000+002

SENSITIVITY TO   4  3 ELEMENT OF C      MATRIX:                  BASELINE PARAMETER VALUE = -1.89024-001

  .........POLE LOCATION..........     ............................SENSITIVITY..............................
      REAL              IMAGINARY               REAL             IMAGINARY          MAGNITUDE          PHASE

  (-3.49854+002) + J( 0.00000     )    (-9.55787-002) + J( 0.00000     )    1.80666-002     1.80000+002
  (-1.00200+001) + J( 2.96341+000)     (-1.94308-001) + J(-3.33200-001)     7.29096-002    -1.20249+002
  (-1.00200+001) + J(-2.96341+000)     (-1.94308-001) + J( 3.33200-001)     7.29096-002     1.20249+002
  (-1.05634+001) + J( 0.00000     )    (-6.07358-003) + J( 0.00000     )    1.14805-003     1.80000+002
  (-6.13391+000) + J( 0.00000     )    ( 1.68968-001) + J( 0.00000     )    3.19390-002     1.11022-016
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SENSITIVITY TO 4 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -7.64106-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-6.96373+000)	+ J(0.00000)	5.32103-004	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(1.44400+002)	+ J(-5.45089+000)	1.10416-002	-2.16180+000
(-1.00200+001)	+ J(-2.96341+000)	(1.44400+002)	+ J(5.45089+000)	1.10416-002	2.16180+000
(-1.05634+001)	+ J(0.00000)	(-4.24126+002)	+ J(0.00000)	3.24077-002	1.80000+002
(-6.13391+000)	+ J(0.00000)	(1.42289+002)	+ J(0.00000)	1.08724-002	1.11022-016

SENSITIVITY TO 4 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.32416-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(6.32933+001)	+ J(0.00000)	1.47104+001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(4.36576-002)	+ J(-1.38054-001)	3.36522-002	-7.24513+001
(-1.00200+001)	+ J(-2.96341+000)	(4.36576-002)	+ J(1.38054-001)	3.36522-002	7.24513+001
(-1.05634+001)	+ J(0.00000)	(-9.08874-001)	+ J(0.00000)	2.11237-001	1.80000+002
(-6.13391+000)	+ J(0.00000)	(9.83071-002)	+ J(0.00000)	2.28482-002	1.11022-016

SENSITIVITY TO 5 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -7.93757-006

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(3.53549+004)	+ J(0.00000)	2.80632-001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-1.31658+004)	+ J(-5.05253+003)	1.11935-001	-1.59005+002
(-1.00200+001)	+ J(-2.96341+000)	(-1.31658+004)	+ J(5.05253+003)	1.11935-001	1.59005+002
(-1.05634+001)	+ J(0.00000)	(1.54331+004)	+ J(0.00000)	1.22501-001	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-2.25652+003)	+ J(0.00000)	1.79113-002	1.80000+002

SENSITIVITY TO 5 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 7.52679-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(1.75385+004)	+ J(0.00000)	1.32008+000	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-2.56478+003)	+ J(1.04769+003)	2.08531-001	1.57781+002
(-1.00200+001)	+ J(-2.96341+000)	(-2.56478+003)	+ J(-1.04769+003)	2.08531-001	-1.57781+002
(-1.05634+001)	+ J(0.00000)	(3.28784+003)	+ J(0.00000)	2.47469-001	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-7.57476+003)	+ J(0.00000)	5.70136-001	1.80000+002

SENSITIVITY TO 5 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.05981-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(9.70245+001)	+ J(0.00000)	5.87950-001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-9.92744+001)	+ J(-2.80420+001)	6.25124-001	-1.64227+002
(-1.00200+001)	+ J(-2.96341+000)	(-9.92744+001)	+ J(2.80420+001)	6.25124-001	1.64227+002
(-1.05634+001)	+ J(0.00000)	(-1.21255+000)	+ J(0.00000)	7.34785-003	1.80000+002
(-6.13391+000)	+ J(0.00000)	(2.85569+001)	+ J(0.00000)	1.73049-001	1.11022-016

SENSITIVITY TO 5 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.13751-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(7.06907+003)	+ J(0.00000)	8.04116-002	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(2.67787+004)	+ J(-2.78656+004)	4.39614-001	-4.61395+001
(-1.00200+001)	+ J(-2.96341+000)	(2.67787+004)	+ J(2.78656+004)	4.39614-001	4.61395+001
(-1.05634+001)	+ J(0.00000)	(-8.46742+004)	+ J(0.00000)	9.63180-001	1.80000+002
(-6.13391+000)	+ J(0.00000)	(2.40478+004)	+ J(0.00000)	2.73547-001	1.11022-016

83/0K/0 OPTIMAL CONTROL DESIGN POINT HPG3

SYSTEMS CONTROL, INC. (VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 5 5 ELEMENT OF C MATRIX:

BASELINE PARAMETER VALUE = 2.51112-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-6.42507+004)	+ J(0.00000)	1.61341+002	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-1.72358+001)	+ J(-3.46772+001)	9.72416-002	-1.16429+002
(-1.00200+001)	+ J(-2.96341+000)	(-1.72358+001)	+ J(3.46772+001)	9.72416-002	1.16429+002
(-1.05634+001)	+ J(0.00000)	(-1.81451+002)	+ J(0.00000)	4.55646-001	1.80000+002
(-6.13391+000)	+ J(0.00000)	(1.66146+001)	+ J(0.00000)	4.17212-002	1.11022-016

SENSITIVITY OF OPTIMAL CONTROLLER DESIGN

SENSITIVITY TO 1 1 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 1.00000-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-2.64226+000)	+ J(0.00000)	2.64226-003	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-1.24177+002)	+ J(1.92087+003)	1.92488+000	9.36989+001
(-1.00200+001)	+ J(-2.96341+000)	(-1.24177+002)	+ J(-1.92087+003)	1.92488+000	-9.36989+001
(-1.06654+001)	+ J(0.00000)	(-1.11012+003)	+ J(0.00000)	1.11012+000	1.80000+002
(-6.13391+000)	+ J(0.00000)	(-1.96304+002)	+ J(0.00000)	1.96304-001	1.80000+002

SENSITIVITY TO 2 2 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 2.00000-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-2.87735+000)	+ J(0.00000)	5.75469-003	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(7.31817+001)	+ J(1.21768+002)	2.84134-001	5.89945+001
(-1.00200+001)	+ J(-2.96341+000)	(7.31817+001)	+ J(-1.21768+002)	2.84134-001	-5.89945+001
(-1.06634+001)	+ J(0.00000)	(2.53478+001)	+ J(0.00000)	5.06955-002	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-7.48078+002)	+ J(0.00000)	1.49616+000	1.80000+002

SENSITIVITY TO 3 3 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 5.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(1.43333-004)	+ J(0.00000)	7.16666-004	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-8.94498-002)	+ J(-1.62439-001)	9.27196-001	-1.18840+002
(-1.00200+001)	+ J(-2.96341+000)	(-8.94498-002)	+ J(1.62439-001)	9.27196-001	1.18840+002
(-1.06634+001)	+ J(0.00000)	(-1.71170-003)	+ J(0.00000)	8.55850-003	1.80000+002
(-6.13391+000)	+ J(0.00000)	(-2.26132-002)	+ J(0.00000)	1.13066-001	1.80000+002

SENSITIVITY TO 4 4 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 0.00000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-3.77440+000)	+ J(0.00000)	3.77440+000	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-1.64239+004)	+ J(-1.15251+004)	2.00643+004	1.44942+002
(-1.00200+001)	+ J(-2.96341+000)	(-1.64239+004)	+ J(1.15251+004)	2.00643+004	1.44942+002
(-1.05634+001)	+ J(0.00000)	(-1.61073+004)	+ J(0.00000)	1.61073+004	1.80000+002
(-6.13391+000)	+ J(0.00000)	(1.14969+004)	+ J(0.00000)	1.14969+004	1.11022-016

SENSITIVITY TO 5 5 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 2.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(-6.57147+001)	+ J(0.00000)	1.31429+002	1.80000+002
(-1.00200+001)	+ J(2.96341+000)	(-2.92959-002)	+ J(-8.38775-002)	1.77693-001	1.09253+002
(-1.00200+001)	+ J(-2.96341+000)	(-2.92959-002)	+ J(8.38775-002)	1.77693-001	1.09253+002
(-1.05634+001)	+ J(0.00000)	(-4.01518-001)	+ J(0.00000)	8.03036-001	1.80000+002
(-6.13391+000)	+ J(0.00000)	(1.18402-002)	+ J(0.00000)	2.36804-002	1.11022-016

SENSITIVITY TO 1 1 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(4.61646+003)	+ J(0.00000)	4.61646-001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(5.46826+003)	+ J(-1.07207+004)	1.20348+000	6.29755+001
(-1.00200+001)	+ J(-2.96341+000)	(5.46826+003)	+ J(1.07207+004)	1.20348+000	6.29755+001
(-1.05634+001)	+ J(0.00000)	(2.20826+003)	+ J(0.00000)	2.20826-001	1.11022-016
(-6.13391+000)	+ J(0.00000)	(7.17193+003)	+ J(0.00000)	7.17193-001	1.11022-016

SENSITIVITY TO 2 2 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000+003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(5.13859-005)	+ J(0.00000)	1.02772-001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-1.33789-005)	+ J(2.72859-004)	5.46374-001	9.28072+001
(-1.00200+001)	+ J(-2.96341+000)	(-1.33789-005)	+ J(-2.72859-004)	5.46374-001	-9.28072+001
(-1.05634+001)	+ J(0.00000)	(1.15623-003)	+ J(0.00000)	2.31247+000	1.11022-016
(-6.13391+000)	+ J(0.00000)	(3.69920-004)	+ J(0.00000)	7.39841-001	2.22045-016

SENSITIVITY TO 3 3 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(4.44653-001)	+ J(0.00000)	8.89306-001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(6.47936-003)	+ J(-2.24193-001)	4.48573-001	-8.83446+001
(-1.00200+001)	+ J(-2.96341+000)	(6.47936-003)	+ J(2.24193-001)	4.48573-001	8.83446+001
(-1.05634+001)	+ J(0.00000)	(3.38577-001)	+ J(0.00000)	6.77154-001	1.11022-016
(-6.13391+000)	+ J(0.00000)	(-1.20504-002)	+ J(0.00000)	2.41008-002	1.80000+002

SENSITIVITY TO 4 4 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(1.12090+001)	+ J(0.00000)	1.12090+001	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(5.12822-002)	+ J(-1.16005-001)	1.26834-001	-6.61512+001
(-1.00200+001)	+ J(-2.96341+000)	(5.12822-002)	+ J(1.16005-001)	1.26834-001	6.61512+001
(-1.05634+001)	+ J(0.00000)	(-3.72866-001)	+ J(0.00000)	3.72866-001	1.80000+002
(-6.13391+000)	+ J(0.00000)	(3.43799-001)	+ J(0.00000)	3.43799-001	1.11022-016

SENSITIVITY TO 5 5 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000+005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-3.49854+002)	+ J(0.00000)	(1.18788-003)	+ J(0.00000)	1.18788+002	1.11022-016
(-1.00200+001)	+ J(2.96341+000)	(-1.00607-006)	+ J(-9.38336-007)	1.37574-001	-1.36995+002
(-1.00200+001)	+ J(-2.96341+000)	(-1.00607-006)	+ J(9.38336-007)	1.37574-001	1.36995+002
(-1.05634+001)	+ J(0.00000)	(-9.66378-006)	+ J(0.00000)	9.66378-001	1.80000+002
(-6.13371+000)	+ J(0.00000)	(5.29129-008)	+ J(0.00000)	5.29129-003	1.11022-016

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+--------------------------------------+
!  SENSITIVITY OF CLOSED LOOP SYSTEM   !
+--------------------------------------+

SENSITIVITY TO   1  1 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -1.10079+000

   .........POLE LOCATION..........       ...........................SENSITIVITY...........................
      REAL              IMAGINARY              REAL              IMAGINARY          MAGNITUDE         PHASE

   (-2.85272+002) + J( 0.00000     )      ( 3.56017-001) + J( 0.00000     )      3.91900-001      1.11022-016
   (-1.22957+001) + J( 4.12893+000)       ( 1.87598-001) + J(-2.14176+000)       2.36665+000     -8.49943+001
   (-1.22957+001) + J(-4.12893+000)       ( 1.87598-001) + J( 2.14176+000)       2.36665+000      8.49943+001
   (-8.32037+000) + J( 3.35619+000)       (-3.81481-001) + J(-1.52605-001)       4.52284-001     -1.58197+002
   (-8.32037+000) + J(-3.35619+000)       (-3.81481-001) + J( 1.52605-001)       4.52284-001      1.58197+002

SENSITIVITY TO   1  2 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -2.65115+000.

   .........POLE LOCATION..........       ...........................SENSITIVITY...........................
      REAL              IMAGINARY              REAL              IMAGINARY          MAGNITUDE         PHASE

   (-2.85272+002) + J( 0.00000     )      ( 1.50717-001) + J( 0.00000     )      3.99573-001      1.11022-016
   (-1.22957+001) + J( 4.12893+000)       ( 1.32008-001) + J( 8.17788-002)       4.11687-001      3.17783+001
   (-1.22957+001) + J(-4.12893+000)       ( 1.32008-001) + J(-8.17788-002)       4.11687-001     -3.17783+001
   (-8.32037+000) + J( 3.35619+000)       ( 1.22784-001) + J(-3.24665-001)       9.20233-001     -6.92841+001
   (-8.32037+000) + J(-3.35619+000)       ( 1.22784-001) + J( 3.24665-001)       9.20233-001      6.92841+001

SENSITIVITY TO   1  3 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE =  1.65710+001

   .........POLE LOCATION..........       ...........................SENSITIVITY...........................
      REAL              IMAGINARY              REAL              IMAGINARY          MAGNITUDE         PHASE

   (-2.85272+002) + J( 0.00000     )      ( 8.71190-004) + J( 0.00000     )      1.44365-002      1.11022-016
   (-1.22957+001) + J( 4.12893+000)       (-3.45170-003) + J(-1.44296-002)       2.45859-001     -1.03453+002
   (-1.22957+001) + J(-4.12893+000)       (-3.45170-003) + J( 1.44296-002)       2.45859-001      1.03453+002
   (-8.32037+000) + J( 3.35619+000)       ( 1.85811-003) + J( 1.56888-003)       4.02983-002      4.01758+001
   (-8.32037+000) + J(-3.35619+000)       ( 1.85811-003) + J(-1.56888-003)       4.02983-002     -4.01758+001
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SENSITIVITY TO   1  4 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -3.54623-001

.........POLE LOCATION..........      ..........................SENSITIVITY.............................
    REAL            IMAGINARY                REAL              IMAGINARY          MAGNITUDE         PHASE

(-2.85272+002) + J( 0.00000     )     ( 1.96907-001) + J( 0.00000     )     6.98277-002      1.11022-016
(-1.22957+001) + J( 4.12893+000)      ( 3.82169+000) + J( 2.20907+000)     1.56538+000      3.00294+001
(-1.22957+001) + J(-4.12893+000)      ( 3.82169+000) + J(-2.20907+000)     1.56538+000     -3.00294+001
(-8.32037+000) + J( 3.35619+000)      ( 1.07986+000) + J( 1.23358+000)     5.81387-001      4.88015+001
(-8.32037+000) + J(-3.35619+000)      ( 1.07986+000) + J(-1.23358+000)     5.81387-001     -4.88015+001

SENSITIVITY TO   1  5 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE =  8.07091+000

.........POLE LOCATION..........      ..........................SENSITIVITY.............................
    REAL            IMAGINARY                REAL              IMAGINARY          MAGNITUDE         PHASE

(-2.85272+002) + J( 0.00000     )     (-5.69097-001) + J( 0.00000     )     4.59313+000      1.80000+002
(-1.22957+001) + J( 4.12893+000)      ( 2.22380-002) + J(-5.88629-003)     1.85662-001     -1.48259+001
(-1.22957+001) + J(-4.12893+000)      ( 2.22380-002) + J( 5.88629-003)     1.85662-001      1.48259+001
(-8.32037+000) + J( 3.35619+000)      ( 3.11058-003) + J(-5.90386-003)     5.38586-002     -6.22166+001
(-8.32037+000) + J(-3.35619+000)      ( 3.11058-003) + J( 5.90386-003)     5.38586-002      6.22166+001

SENSITIVITY TO   2  1 ELEMENT OF C      MATRIX:                    BASELINE PARAMETER VALUE = -9.85169-005

.........POLE LOCATION..........      ..........................SENSITIVITY.............................
    REAL            IMAGINARY                REAL              IMAGINARY          MAGNITUDE         PHASE

(-2.85272+002) + J( 0.00000     )     ( 1.03044+003) + J( 0.00000     )     1.01516-001      1.11022-016
(-1.22957+001) + J( 4.12893+000)      (-4.70855+003) + J(-6.11991+003)     7.60712-001     -1.27574+002
(-1.22957+001) + J(-4.12893+000)      (-4.70855+003) + J( 6.11991+003)     7.60712-001      1.27574+002
(-8.32037+000) + J( 3.35619+000)      ( 4.16080+003) + J(-5.33786+002)     4.13269-001     -7.31050+000
(-8.32037+000) + J(-3.35619+000)      ( 4.16080+003) + J( 5.33786+002)     4.13269-001      7.31050+000
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SENSITIVITY TO   2  2 ELEMENT OF C      MATRIX:                 BASELINE PARAMETER VALUE =  -1.41500-004

   ..........POLE LOCATION..........        ..........................SENSITIVITY..................................
        REAL            IMAGINARY                 REAL            IMAGINARY          MAGNITUDE          PHASE

   (-2.86272+002) + J( 0.00000     )       ( 4.36229+002) + J( 0.00000     )     6.17265-002      1.11022-016
   (-1.22957+001) + J( 4.12893+000)        ( 5.47832+002) + J(-1.04520+002)      7.89166-002     -1.08016+001
   (-1.22957+001) + J(-4.12893+000)        ( 5.47832+002) + J( 1.04520+002)      7.89166-002      1.08016+001
   (-8.32037+000) + J( 3.35619+000)        ( 5.17553+002) + J( 3.50588+003)      5.01459-001      8.16025+001
   (-8.32037+000) + J(-3.35619+000)        ( 5.17553+002) + J(-3.50588+003)      5.01459-001     -8.16025+001

SENSITIVITY TO   2  3 ELEMENT OF C      MATRIX:                 BASELINE PARAMETER VALUE =  2.79849-002

   ..........POLE LOCATION..........        ..........................SENSITIVITY..................................
        REAL            IMAGINARY                 REAL            IMAGINARY          MAGNITUDE          PHASE

   (-2.86272+002) + J( 0.00000     )       ( 2.52154+000) + J( 0.00000     )     7.05651-002      1.11022-016
   (-1.22957+001) + J( 4.12893+000)        (-4.41934+001) + J(-2.97721+001)      1.49122+000     -1.46033+002
   (-1.22957+001) + J(-4.12893+000)        (-4.41934+001) + J( 2.97721+001)      1.49122+000      1.46033+002
   (-8.32037+000) + J( 3.35619+000)        (-2.43673+001) + J(-4.76399+000)      6.94828-001      1.68938+002
   (-8.32037+000) + J(-3.35619+000)        (-2.43673+001) + J( 4.76399+000)      6.94828-001      1.68938+002

SENSITIVITY TO   2  4 ELEMENT OF C      MATRIX:                 BASELINE PARAMETER VALUE =  8.76632-008

   ..........POLE LOCATION..........        ..........................SENSITIVITY..................................
        REAL            IMAGINARY                 REAL            IMAGINARY          MAGNITUDE          PHASE

   (-2.86272+002) + J( 0.00000     )       ( 5.69920+002) + J( 0.00000     )     4.99610-005      1.11022-016
   (-1.22957+001) + J( 4.12893+000)        ( 1.54749+004) + J(-3.44501+003)      1.38979-003     -1.25505+001
   (-1.22957+001) + J(-4.12893+000)        ( 1.54749+004) + J( 3.44501+003)      1.38979-003      1.25505+001
   (-8.32037+000) + J( 3.35619+000)        (-1.57599+004) + J(-5.63911+003)      1.46734-003     -1.60312+002
   (-8.32037+000) + J(-3.35619+000)        (-1.57599+004) + J( 5.63911+003)      1.46734-003      1.60312+002
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SENSITIVITY TO 2 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 7.40016-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-1.64717+003)	+ J(0.00000)	1.21894+000	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(4.45055+001)	+ J(-6.96068+001)	6.11392-002	-5.74058+001
(-1.22957+001)	+ J(-4.12893+000)	(4.45055+001)	+ J(6.96068+001)	6.11392-002	5.74058+001
(-8.32037+000)	+ J(3.35619+000)	(1.58151+000)	+ J(6.81131+001)	5.04184-002	8.86700+001
(-8.32037+000)	+ J(-3.35619+000)	(1.58151+000)	+ J(-6.81131+001)	5.04184-002	-8.86700+001

SENSITIVITY TO 3 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.28333-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-1.46229+002)	+ J(0.00000)	3.33889-001	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-2.63992+001)	+ J(1.21019+002)	2.82824-001	1.02306+002
(-1.22957+001)	+ J(-4.12893+000)	(-2.63992+001)	+ J(-1.21019+002)	2.82824-001	-1.02306+002
(-8.32037+000)	+ J(3.35619+000)	(-6.14863+001)	+ J(1.32802+001)	1.43631-001	1.67812+002
(-8.32037+000)	+ J(-3.35619+000)	(-6.14863+001)	+ J(-1.32802+001)	1.43631-001	-1.67812+002

SENSITIVITY TO 3 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.17474-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-6.19048+001)	+ J(0.00000)	2.58436-002	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-6.94497+000)	+ J(-5.63966+000)	3.73489-003	-1.40922+002
(-1.22957+001)	+ J(-4.12893+000)	(-6.94497+000)	+ J(5.63966+000)	3.73489-003	1.40922+002
(-8.32037+000)	+ J(3.35619+000)	(-1.22026+001)	+ J(-5.17217+001)	2.21853-002	-1.03275+002
(-8.32037+000)	+ J(-3.35619+000)	(-1.22026+001)	+ J(5.17217+001)	2.21853-002	1.03275+002

83/0K/1.2 OPTIMAL CONTROL DESIGN POINT HPG4

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 3 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.35335-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-3.57829-001)	+ J(0.00000)	4.84269-002	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(9.16169-002)	+ J(8.49855-001)	1.15682-001	8.38472+001
(-1.22957+001)	+ J(-4.12893+000)	(9.16169-002)	+ J(-8.49855-001)	1.15682-001	-8.38472+001
(-8.32037+000)	+ J(3.35619+000)	(3.70148-001)	+ J(4.01119-002)	5.03873-002	6.18486+000
(-8.32037+000)	+ J(-3.35619+000)	(3.70148-001)	+ J(-4.01119-002)	5.03873-002	-6.18486+000

SENSITIVITY TO 3 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.23093-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-8.08768+001)	+ J(0.00000)	1.80430-003	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-2.02221+002)	+ J(-1.54215+002)	5.67356-003	-1.42671+002
(-1.22957+001)	+ J(-4.12893+000)	(-2.02221+002)	+ J(1.54215+002)	5.67356-003	1.42671+002
(-8.32037+000)	+ J(3.35619+000)	(2.42659+002)	+ J(6.41612+001)	5.59959-003	1.48106+001
(-8.32037+000)	+ J(-3.35619+000)	(2.42659+002)	+ J(-6.41612+001)	5.59959-003	-1.48106+001

SENSITIVITY TO 3 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.75250-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(2.33749+002)	+ J(0.00000)	1.11089+001	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(-1.31389+000)	+ J(1.73582-001)	6.29852-002	1.72474+002
(-1.22957+001)	+ J(-4.12893+000)	(-1.31389+000)	+ J(-1.73582-001)	6.29852-002	-1.72474+002
(-8.32037+000)	+ J(3.35619+000)	(-1.10471-001)	+ J(-1.01567+000)	4.85542-002	-9.62076+001
(-8.32037+000)	+ J(-3.35619+000)	(-1.10471-001)	+ J(1.01567+000)	4.85542-002	9.62076+001

SENSITIVITY TO 4 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -5.60451-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-1.14280+002)	+ J(0.00000)	6.40483-001	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(1.50732+001)	+ J(-7.66855+001)	4.38009-001	-7.88799+001
(-1.22957+001)	+ J(-4.12893+000)	(1.50732+001)	+ J(7.66855+001)	4.38009-001	7.88799+001
(-8.32037+000)	+ J(3.35619+000)	(4.45852+001)	+ J(3.34215+001)	3.12290-001	3.68556+001
(-8.32037+000)	+ J(-3.35619+000)	(4.45852+001)	+ J(-3.34215+001)	3.12290-001	-3.68556+001

SENSITIVITY TO 4 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.99927-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-4.83793+001)	+ J(0.00000)	1.93482-001	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(4.45464+000)	+ J(3.46693+000)	2.25750-002	3.78927+001
(-1.22957+001)	+ J(-4.12893+000)	(4.45464+000)	+ J(-3.46693+000)	2.25750-002	-3.78927+001
(-8.32037+000)	+ J(3.35619+000)	(-2.75150+001)	+ J(3.81947+001)	1.88259-001	1.25769+002
(-8.32037+000)	+ J(-3.35619+000)	(-2.75150+001)	+ J(-3.81947+001)	1.88259-001	-1.25769+002

SENSITIVITY TO 4 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.83162-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-2.79648-001)	+ J(0.00000)	5.12209-002	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-6.88886-002)	+ J(-5.34909-001)	9.87842-002	-9.73386+001
(-1.22957+001)	+ J(-4.12893+000)	(-6.88886-002)	+ J(5.34909-001)	9.87842-002	9.73386+001
(-8.32037+000)	+ J(3.35619+000)	(-1.88087-001)	+ J(-2.70908-001)	6.04069-002	-1.24772+002
(-8.32037+000)	+ J(-3.35619+000)	(-1.88087-001)	+ J(2.70908-001)	6.04069-002	1.24772+002

SENSITIVITY TO 4 4 ELEMENT OF C MATRIX! BASELINE PARAMETER VALUE = -7.95231-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-6.32062+001)	+ J(0.00000)	5.02635-002	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(1.29578+002)	+ J(9.46417+001)	1.27603-001	3.61438+001
(-1.22957+001)	+ J(-4.12893+000)	(1.29578+002)	+ J(-9.46417+001)	1.27603-001	-3.61438+001
(-8.32037+000)	+ J(3.35619+000)	(-9.79749+001)	+ J(-1.99586+002)	1.76809-001	-1.16146+002
(-8.32037+000)	+ J(-3.35619+000)	(-9.79749+001)	+ J(1.99586+002)	1.76809-001	1.16146+002

SENSITIVITY TO 4 5 ELEMENT OF C MATRIX! BASELINE PARAMETER VALUE = -1.03356-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(1.82677+002)	+ J(0.00000)	1.88808+001	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(8.26560-001)	+ J(-1.26651-001)	8.64271-002	-8.71152+000
(-1.22957+001)	+ J(-4.12893+000)	(8.26560-001)	+ J(1.26651-001)	8.64271-002	8.71152+000
(-8.32037+000)	+ J(3.35619+000)	(-6.15307-001)	+ J(6.63634-001)	9.35366-002	1.32836+002
(-8.32037+000)	+ J(-3.35619+000)	(-6.15307-001)	+ J(-6.63634-001)	9.35366-002	-1.32836+002

SENSITIVITY TO 5 1 ELEMENT OF C MATRIX! BASELINE PARAMETER VALUE = 2.28857-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(7.13749+004)	+ J(0.00000)	1.63346+000	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(-2.42429+004)	+ J(1.43645+004)	6.44896-001	1.49352+002
(-1.22957+001)	+ J(-4.12893+000)	(-2.42429+004)	+ J(-1.43645+004)	6.44896-001	-1.49352+002
(-8.32037+000)	+ J(3.35619+000)	(8.86539+003)	+ J(9.63415+003)	2.99630-001	4.73796+001
(-8.32037+000)	+ J(-3.35619+000)	(8.86539+003)	+ J(-9.63415+003)	2.99630-001	-4.73796+001

SENSITIVITY TO 5 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 3.86320-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(3.02159+004)	+ J(0.00000)	1.16730+000	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(-1.37559+002)	+ J(-2.03064+003)	7.86275-002	-9.38755+001
(-1.22957+001)	+ J(-4.12893+000)	(-1.37559+002)	+ J(2.03064+003)	7.86275-002	9.38755+001
(-8.32037+000)	+ J(3.35619+000)	(-7.99541+003)	+ J(7.64259+003)	4.27291-001	1.36293+002
(-8.32037+000)	+ J(-3.35619+000)	(-7.99541+003)	+ J(-7.64259+003)	4.27291-001	-1.36293+002

SENSITIVITY TO 5 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.52063-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(1.74658+002)	+ J(0.00000)	4.40283-002	0.00000
(-1.22957+001)	+ J(4.12893+000)	(-1.27305+002)	+ J(1.46999+002)	4.90203-002	1.30894+002
(-1.22957+001)	+ J(-4.12893+000)	(-1.27305+002)	+ J(-1.46999+002)	4.90203-002	-1.30894+002
(-8.32037+000)	+ J(3.35619+000)	(-3.18242+001)	+ J(-7.06547+001)	1.95342-002	-1.14248+002
(-8.32037+000)	+ J(-3.35619+000)	(-3.18242+001)	+ J(7.06547+001)	1.95342-002	1.14248+002

SENSITIVITY TO 5 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.09793-006

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(3.94763+004)	+ J(0.00000)	2.40723-001	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(-5.67015+003)	+ J(-5.75775+004)	3.52802-001	-9.56244+001
(-1.22957+001)	+ J(-4.12893+000)	(-5.67015+003)	+ J(5.75775+004)	3.52802-001	9.56244+001
(-8.32037+000)	+ J(3.35619+000)	(-1.40680+004)	+ J(-5.03113+004)	3.18563-001	-1.05622+002
(-8.32037+000)	+ J(-3.35619+000)	(-1.40680+004)	+ J(5.03113+004)	3.18563-001	1.05622+002

SENSITIVITY TO 5 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.52071-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.86272+002)	+ J(0.00000)	(-1.14094+005)	+ J(0.00000)	7.43971+001	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-2.32580+002)	+ J(-1.91864+002)	1.96603-001	-1.40480+002
(-1.22957+001)	+ J(-4.12893+000)	(-2.32580+002)	+ J(1.91864+002)	1.96603-001	1.40480+002
(-8.32037+000)	+ J(3.35619+000)	(-1.70623+002)	+ J(1.26901+002)	1.38657-001	1.43360+002
(-8.32037+000)	+ J(-3.35619+000)	(-1.70623+002)	+ J(-1.26901+002)	1.38657-001	-1.43360+002

SENSITIVITY OF OPTIMAL CONTROLLER DESIGN

SENSITIVITY TO 1 1 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 4.00000-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-4.13703+000)	+ J(0.00000)	1.65481-002	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-1.22863+002)	+ J(3.15641+002)	1.35484+000	1.11269+002
(-1.22957+001)	+ J(-4.12893+000)	(-1.22863+002)	+ J(-3.15641+002)	1.35484+000	-1.11269+002
(-8.32037+000)	+ J(3.35619+000)	(-1.18924+002)	+ J(-7.38250+000)	4.76613-001	-1.76448+002
(-8.32037+000)	+ J(-3.35619+000)	(-1.18924+002)	+ J(7.38250+000)	4.76613-001	1.76448+002

SENSITIVITY TO 2 2 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 2.00000-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-4.01913+000)	+ J(0.00000)	8.03826-003	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-1.63073+001)	+ J(-1.35546+001)	4.24101-002	-1.40267+002
(-1.22957+001)	+ J(-4.12893+000)	(-1.63073+001)	+ J(1.35546+001)	4.24101-002	1.40267+002
(-8.32037+000)	+ J(3.35619+000)	(-6.63878+001)	+ J(5.00058+001)	1.66228-001	1.43012+002
(-8.32037+000)	+ J(-3.35619+000)	(-6.63878+001)	+ J(-5.00058+001)	1.66228-001	-1.43012+002

SENSITIVITY TO 3 3 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 3.00000+001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(3.13292-004)	+ J(0.00000)	9.39876-003	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(-3.00927-002)	+ J(-1.88104-002)	1.06464+000	-1.47991+002
(-1.22957+001)	+ J(-4.12893+000)	(-3.00927-002)	+ J(1.88104-002)	1.06464+000	1.47991+002
(-8.32037+000)	+ J(3.35619+000)	(-2.00528-002)	+ J(-9.92546-003)	6.71242-001	-1.53666+002
(-8.32037+000)	+ J(-3.35619+000)	(-2.00528-002)	+ J(9.92546-003)	6.71242-001	1.53666+002

SENSITIVITY TO 4 4 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 0.00000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-2.81844+001)	+ J(0.00000)	2.81844+001	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-5.88110+003)	+ J(-4.77116+003)	7.57306+003	-1.40949+002
(-1.22957+001)	+ J(-4.12893+000)	(-5.88110+003)	+ J(4.77116+003)	7.57306+003	1.40949+002
(-8.32037+000)	+ J(3.35619+000)	(-2.28416+003)	+ J(-2.96428+003)	3.74224+003	-1.27617+002
(-8.32037+000)	+ J(-3.35619+000)	(-2.28416+003)	+ J(2.96428+003)	3.74224+003	1.27617+002

SENSITIVITY TO 5 5 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 2.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(-4.36528+001)	+ J(0.00000)	8.73056+001	1.80000+002
(-1.22957+001)	+ J(4.12893+000)	(-1.66902-001)	+ J(-1.51876-001)	4.51321-001	-1.37699+002
(-1.22957+001)	+ J(-4.12893+000)	(-1.66902-001)	+ J(1.51876-001)	4.51321-001	1.37699+002
(-8.32037+000)	+ J(3.35619+000)	(-6.09846-002)	+ J(7.51752-002)	1.93602-001	1.29050+002
(-8.32037+000)	+ J(-3.35619+000)	(-6.09846-002)	+ J(-7.51752-002)	1.93602-001	-1.29050+002

SENSITIVITY TO 1 1 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(2.30717+004)	+ J(0.00000)	4.61435+000	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(6.85272+003)	+ J(-4.34319+003)	1.62263+000	-3.23661+001
(-1.22957+001)	+ J(-4.12893+000)	(6.85272+003)	+ J(4.34319+003)	1.62263+000	3.23661+001
(-8.32037+000)	+ J(3.35619+000)	(6.95447+002)	+ J(-2.52199+003)	5.23224-001	-7.45837+001
(-8.32037+000)	+ J(-3.35619+000)	(6.95447+002)	+ J(2.52199+003)	5.23224-001	7.45837+001

SENSITIVITY TO 2 2 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 8.00000+003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(1.31453-004)	+ J(0.00000)	1.0[illegible]+000	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(8.33348-005)	+ J(2.26027-005)	6.90765-001	1.51751+001
(-1.22957+001)	+ J(-4.12893+000)	(8.33348-005)	+ J(-2.26027-005)	6.90765-001	-1.51751+001
(-8.32037+000)	+ J(3.35619+000)	(1.17624-004)	+ J(4.62415-005)	1.01110+000	2.14612+001
(-8.32037+000)	+ J(-3.35619+000)	(1.17624-004)	+ J(-4.62415-005)	1.01110+000	-2.14612+001

SENSITIVITY TO 3 3 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000+001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(4.67314-001)	+ J(0.00000)	9.34627+000	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(1.87591-003)	+ J(-6.89359-003)	1.42885-001	-7.47772+001
(-1.22957+001)	+ J(-4.12893+000)	(1.87591-003)	+ J(6.89359-003)	1.42885-001	7.47772+001
(-8.32037+000)	+ J(3.35619+000)	(6.51793-003)	+ J(-3.08357-003)	1.44211-001	-2.53184+001
(-8.32037+000)	+ J(-3.35619+000)	(6.51793-003)	+ J(3.08357-003)	1.44211-001	2.53184+001

SENSITIVITY TO 4 4 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 8.00000+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.85272+002)	+ J(0.00000)	(1.83018+000)	+ J(0.00000)	1.46414+001	1.11022-016
(-1.22957+001)	+ J(4.12893+000)	(2.23370-003)	+ J(-1.17589-002)	9.57533-002	-7.92444+001
(-1.22957+001)	+ J(-4.12893+000)	(2.23370-003)	+ J(1.17589-002)	9.57533-002	7.92444+001
(-8.32037+000)	+ J(3.35619+000)	(1.04456-003)	+ J(4.08132-002)	3.26612-001	8.85340+001
(-8.32037+000)	+ J(-3.35619+000)	(1.04456-003)	+ J(-4.08132-002)	3.26612-001	-8.85340+001

SENSITIVITY TO 5 5 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 8.00000+005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-2.95272+002) +	J(0.00000)	(7.20948-005) +	J(0.00000)	5.76758+001	1.11022-016
(-1.22957+001) +	J(4.12893+000)	(-4.14730-007) +	J(6.90411-007)	6.44319-001	1.20993+002
(-1.22957+001) +	J(-4.12893+000)	(-4.14730-007) +	J(-6.90411-007)	6.44319-001	1.20993+002
(-8.32037+000) +	J(3.35619+000)	(1.41700-007) +	J(-6.67846-008)	1.25320-001	2.52349+001
(-8.32037+000) +	J(-3.35619+000)	(1.41700-007) +	J(6.67846-008)	1.25320-001	2.52349+001

SENSITIVITY OF CLOSED LOOP SYSTEM

SENSITIVITY TO 1 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.03082+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(6.41813-001)	+ J(0.00000)	6.41590-001	1.11022-016
(-1.04774+001)	+ J(2.15757+000)	(-3.85769-001)	+ J(-8.38139+000)	8.[illegible]62+000	-9.26355+001
(-1.04774+001)	+ J(-2.15757+000)	(-3.85769-001)	+ J(8.38139+000)	8.64882+000	9.26355+001
(-2.42732+000)	+ J(0.00000)	(7.50133-001)	+ J(0.00000)	7.73249-001	1.11022-016
(-2.22719-001)	+ J(0.00000)	(-9.46730-003)	+ J(0.00000)	9.75904-003	1.80000+002

SENSITIVITY TO 1 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.23819+000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(3.54893-001)	+ J(0.00000)	4.39425-001	1.11022-016
(-1.04774+001)	+ J(2.15757+000)	(1.90351+000)	+ J(-6.17767+000)	8.00401+000	-7.28745+001
(-1.04774+001)	+ J(-2.15757+000)	(1.90351+000)	+ J(6.17767+000)	8.00401+000	7.28745+001
(-2.42732+000)	+ J(0.00000)	(-7.48308-001)	+ J(0.00000)	9.26548-001	1.80000+002
(-2.22719-001)	+ J(0.00000)	(-2.60845-003)	+ J(0.00000)	3.22975-003	1.80000+002

SENSITIVITY TO 1 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.12875+002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-2.63885-004)	+ J(0.00000)	2.97861-002	1.80000+002
(-1.04774+001)	+ J(2.15757+000)	(-2.02892-002)	+ J(-1.00426-001)	1.15646+001	-1.01422+002
(-1.04774+001)	+ J(-2.15757+000)	(-2.02892-002)	+ J(1.00426-001)	1.15646+001	1.01422+002
(-2.42732+000)	+ J(0.00000)	(2.89660-004)	+ J(0.00000)	3.26954-002	1.11022-016
(-2.22719-001)	+ J(0.00000)	(5.26757-005)	+ J(0.00000)	5.94580-003	1.11022-016

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SENSITIVITY TO   1  4 ELEMENT OF C        MATRIX:                        BASELINE PARAMETER VALUE = -2.60470-001

   ..........POLE LOCATION...........          .........................SENSITIVITY.............................
       REAL               IMAGINARY                   REAL               IMAGINARY          MAGNITUDE           PHASE

   (-1.43512+002) + J( 0.00000     )          ( 5.81008-001) + J( 0.00000     )          1.51335-001        1.11022-016
   (-1.04774+001) + J( 2.15787+000)          ( 4.65234+000) + J( 2.06689+001)          5.51834+000        7.73149+001
   (-1.04774+001) + J(-2.15787+000)          ( 4.65234+000) + J(-2.06689+001)          5.51834+000       -7.73149+001
   (-2.42732+000) + J( 0.00000     )          ( 9.80305-002) + J( 0.00000     )          2.55340-002        1.11022-016
   (-2.22719-001) + J( 0.00000     )          ( 1.62829-002) + J( 0.00000     )          4.24122-003        1.11022-016

SENSITIVITY TO   1  5 ELEMENT OF C        MATRIX:                        BASELINE PARAMETER VALUE =  9.82336+000

   ..........POLE LOCATION...........          .........................SENSITIVITY.............................
       REAL               IMAGINARY                   REAL               IMAGINARY          MAGNITUDE           PHASE

   (-1.43512+002) + J( 0.00000     )          (-6.59147-001) + J( 0.00000     )          6.47504+000        1.80000+002
   (-1.04774+001) + J( 2.15787+000)          ( 7.93000-002) + J( 4.55569-002)          8.98439-001        2.98823+001
   (-1.04774+001) + J(-2.15787+000)          ( 7.93000-002) + J(-4.55569-002)          8.98439-001       -2.98823+001
   (-2.42732+000) + J( 0.00000     )          (-8.77755-003) + J( 0.00000     )          8.62251-002        1.80000+002
   (-2.22719-001) + J( 0.00000     )          ( 1.24895-004) + J( 0.00000     )          1.22689-003        0.00000

SENSITIVITY TO   2  1 ELEMENT OF C        MATRIX:                        BASELINE PARAMETER VALUE =  5.93753-006

   ..........POLE LOCATION...........          .........................SENSITIVITY.............................
       REAL               IMAGINARY                   REAL               IMAGINARY          MAGNITUDE           PHASE

   (-1.43512+002) + J( 0.00000     )          (-4.47371+000) + J( 0.00000     )          2.65623-005        1.80000+002
   (-1.04774+001) + J( 2.15787+000)          (-2.87788+002) + J( 1.54573+003)          9.33555-003        1.00547+002
   (-1.04774+001) + J(-2.15787+000)          (-2.87788+002) + J(-1.54573+003)          9.33555-003        1.00547+002
   (-2.42732+000) + J( 0.00000     )          ( 2.08150+002) + J( 0.00000     )          1.23589-003        1.11022-016
   (-2.22719-001) + J( 0.00000     )          ( 5.35000+001) + J( 0.00000     )          3.17658-004        1.11022-016
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SENSITIVITY TO 2 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.60979-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-2.47376+000)	+ J(0.00000)	3.98223-004	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(-6.11312+002)	+ J(1.04581+003)	1.95006-001	1.20308+002
(-1.04774+001)	+ J(-2.15787+000)	(-6.11312+002)	+ J(-1.04581+003)	1.95006-001	-1.20308+002
(-2.42732+000)	+ J(0.00000)	(-2.07643+002)	+ J(0.00000)	3.34262-002	1.80000+002
(-2.22712-001)	+ J(0.00000)	(1.47404+001)	+ J(0.00000)	2.37289-003	1.11022-016

SENSITIVITY TO 2 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.62495-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(1.83939-003)	+ J(0.00000)	4.82830-005	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-5.89771-001)	+ J(1.91905+001)	5.03978-001	9.17604+001
(-1.04774+001)	+ J(-2.15787+000)	(-5.89771-001)	+ J(-1.91905+001)	5.03978-001	-9.17604+001
(-2.42732+000)	+ J(0.00000)	(8.03756-002)	+ J(0.00000)	2.10982-003	1.11022-016
(-2.22712-001)	+ J(0.00000)	(-2.97672-001)	+ J(0.00000)	7.81374-003	1.80000+002

SENSITIVITY TO 2 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.83800-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-4.04987+000)	+ J(0.00000)	7.44366-004	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(3.44316+001)	+ J(-3.97002+003)	7.29716-001	-8.95032+001
(-1.04774+001)	+ J(-2.15787+000)	(3.44316+001)	+ J(3.97002+003)	7.29716-001	8.95032+001
(-2.42732+000)	+ J(0.00000)	(2.72018+001)	+ J(0.00000)	4.99969-003	2.22045-016
(-2.22712-001)	+ J(0.00000)	(-9.20152+001)	+ J(0.00000)	1.69124-002	1.80000+002

SENSITIVITY TO 2 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 9.43117-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(4.59454+000)	+ J(0.00000)	4.33319-003	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-1.25216+001)	+ J(-1.17029+001)	1.61641-002	-1.36936+002
(-1.04774+001)	+ J(-2.15787+000)	(-1.25216+001)	+ J(1.17029+001)	1.61641-002	1.36936+002
(-2.42732+000)	+ J(0.00000)	(-2.43563+000)	+ J(0.00000)	2.29708-003	1.80000+002
(-2.22714-001)	+ J(0.00000)	(-7.05784-001)	+ J(0.00000)	6.65637-004	1.80000+002

SENSITIVITY TO 3 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.97371-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-5.45417+000)	+ J(0.00000)	1.62191-002	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(5.14483-001)	+ J(-7.95312+000)	2.36997-002	-8.62988+001
(-1.04774+001)	+ J(-2.15787+000)	(5.14483-001)	+ J(7.95312+000)	2.36997-002	8.62988+001
(-2.42732+000)	+ J(0.00000)	(9.75220-001)	+ J(0.00000)	2.90002-003	1.11022-016
(-2.22714-001)	+ J(0.00000)	(-2.09018-001)	+ J(0.00000)	6.21561-004	1.80000+002

SENSITIVITY TO 3 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -9.46540-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-3.01591+000)	+ J(0.00000)	2.85468-002	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(2.44472+000)	+ J(-5.63263+000)	5.81203-002	-6.65378+001
(-1.04774+001)	+ J(-2.15787+000)	(2.44472+000)	+ J(5.63263+000)	5.81203-002	6.65378+001
(-2.42732+000)	+ J(0.00000)	(-9.72848-001)	+ J(0.00000)	9.20840-003	1.80000+002
(-2.22714-001)	+ J(0.00000)	(-5.75891-002)	+ J(0.00000)	5.45104-004	1.80000+002

SENSITIVITY TO 3 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -5.34169-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.43512+002)	+ J(0.00000)	(2.24251-003)	+ J(0.00000)	1.19788-003	1.11022-016
(-1.04774+001)	+ J(2.15757+000)	(-8.62603-003)	+ J(-9.69368-002)	5.19852-002	-9.50852+001
(-1.04774+001)	+ J(-2.15757+000)	(-8.62603-003)	+ J(9.69368-002)	5.19852-002	9.50852+001
(-2.42732+000)	+ J(0.00000)	(3.76576-004)	+ J(0.00000)	2.01155-004	1.11022-016
(-2.22719-001)	+ J(0.00000)	(1.16297-003)	+ J(0.00000)	6.21224-004	1.11022-016

SENSITIVITY TO 3 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -7.51705-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.43512+002)	+ J(0.00000)	(-4.93744+000)	+ J(0.00000)	3.71150-002	1.80000+002
(-1.04774+001)	+ J(2.15757+000)	(2.22525+000)	+ J(2.00008+001)	1.51275-001	8.36516+001
(-1.04774+001)	+ J(-2.15757+000)	(2.22525+000)	+ J(-2.00008+001)	1.51275-001	-8.36516+001
(-2.42732+000)	+ J(0.00000)	(1.27446-001)	+ J(0.00000)	9.58016-004	0.00000
(-2.22719-001)	+ J(0.00000)	(3.59493-001)	+ J(0.00000)	2.70233-003	1.11022-016

SENSITIVITY TO 3 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.54540-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.43512+002)	+ J(0.00000)	(5.60148+000)	+ J(0.00000)	2.54609+000	1.11022-016
(-1.04774+001)	+ J(2.15757+000)	(7.00881-002)	+ J(5.13324-002)	3.94883-002	3.62190+001
(-1.04774+001)	+ J(-2.15757+000)	(7.00881-002)	+ J(-5.13324-002)	3.94883-002	-3.62190+001
(-2.42732+000)	+ J(0.00000)	(-1.14114-002)	+ J(0.00000)	5.18692-003	1.80000+002
(-2.22719-001)	+ J(0.00000)	(2.75742-003)	+ J(0.00000)	1.25336-003	1.11022-016

20/3**/0.9 OPTIMAL CONTROL DESIGN POINT LPG1

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO 4 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.09419-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.43512+002)	+ J(0.00000)	(-2.84309+001)	+ J(0.00000)	1.16401-001	1.80000+002
(-1.04779+001)	+ J(2.15787+000)	(9.08386-001)	+ J(-3.09236+001)	1.26662-001	-8.83175+001
(-1.04779+001)	+ J(-2.15787+000)	(9.08386-001)	+ J(3.09236+001)	1.26662-001	8.83175+001
(-2.42732+000)	+ J(0.00000)	(2.27985+001)	+ J(0.00000)	9.33412-002	1.11022-016
(-2.22714-001)	+ J(0.00000)	(-1.33602-002)	+ J(0.00000)	5.46991-005	1.80000+002

SENSITIVITY TO 4 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.42149-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.43512+002)	+ J(0.00000)	(-1.57210+001)	+ J(0.00000)	5.37893-002	1.80000+002
(-1.04779+001)	+ J(2.15787+000)	(8.71383+000)	+ J(-2.21854+001)	8.15526-002	-6.85565+001
(-1.04779+001)	+ J(-2.15787+000)	(8.71383+000)	+ J(2.21854+001)	8.15526-002	6.85565+001
(-2.42732+000)	+ J(0.00000)	(-2.27430+001)	+ J(0.00000)	7.78151-002	1.80000+002
(-2.22714-001)	+ J(0.00000)	(-3.68102-003)	+ J(0.00000)	1.25946-005	1.80000+002

SENSITIVITY TO 4 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.57161-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.43512+002)	+ J(0.00000)	(1.16895-002)	+ J(0.00000)	3.00608-003	1.11022-016
(-1.04779+001)	+ J(2.15787+000)	(-4.67187-002)	+ J(-3.74876-001)	9.71491-002	-9.71039+001
(-1.04779+001)	+ J(-2.15787+000)	(-4.67187-002)	+ J(3.74876-001)	9.71491-002	9.71039+001
(-2.42732+000)	+ J(0.00000)	(8.80350-003)	+ J(0.00000)	2.26391-003	1.11022-016
(-2.22719-001)	+ J(0.00000)	(7.43357-005)	+ J(0.00000)	1.91162-005	0.00000

SENSITIVITY TO 4 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.51545-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-2.57374+001)	+ J(0.00000)	3.90038-002	1.80000+002
(-1.04774+001)	+ J(2.15757+000)	(1.13675+001)	+ J(7.72866+001)	1.18384-001	8.16329+001
(-1.04774+001)	+ J(-2.15757+000)	(1.13675+001)	+ J(-7.72866+001)	1.[illegible]84-001	8.16329+001
(-2.42732+000)	+ J(0.00000)	(2.97340+000)	+ J(0.00000)	4.[illegible]4-003	1.11022-016
(-2.22714-001)	+ J(0.00000)	(2.29753-002)	+ J(0.00000)	3.4[illegible]226-005	0.00000

SENSITIVITY TO 4 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.30965-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(2.91968+001)	+ J(0.00000)	6.74390+000	1.11022-016
(-1.04774+001)	+ J(2.15757+000)	(2.78918-001)	+ J(1.89555-001)	7.78891-002	3.42003+001
(-1.04774+001)	+ J(-2.15757+000)	(2.78918-001)	+ J(-1.89555-001)	7.78891-002	3.42003+001
(-2.42732+000)	+ J(0.00000)	(-2.66772-001)	+ J(0.00000)	6.16151-002	1.80000+002
(-2.22714-001)	+ J(0.00000)	(1.76251-004)	+ J(0.00000)	4.07077-005	0.00000

SENSITIVITY TO 5 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.03685-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(6.67193+003)	+ J(0.00000)	6.91786-002	2.22045-016
(-1.04774+001)	+ J(2.15757+000)	(-1.13180+003)	+ J(1.32839+004)	1.38234-001	9.48699+001
(-1.04774+001)	+ J(-2.15757+000)	(-1.13180+003)	+ J(-1.32839+004)	1.38234-001	-9.48699+001
(-2.42732+000)	+ J(0.00000)	(-2.21952+002)	+ J(0.00000)	2.30132-003	1.80000+002
(-2.22714-001)	+ J(0.00000)	(-3.94309+001)	+ J(0.00000)	4.08841-004	1.80000+002

SENSITIVITY TO 5 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.74863-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.45512+002)	+ J(0.00000)	(3.65930+003)	+ J(0.00000)	1.01405-001	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-4.28092+003)	+ J(9.33708+003)	2.82331-001	1.14631+002
(-1.04774+001)	+ J(-2.15787+000)	(-4.28092+003)	+ J(-9.33708+003)	2.82331-001	-1.14631+002
(-2.42732+000)	+ J(0.00000)	(2.21412+002)	+ J(0.00000)	6.08581-003	1.11022-016
(-2.22719-001)	+ J(0.00000)	(-1.05641+001)	+ J(0.00000)	2.98614-004	1.80000+002

SENSITIVITY TO 5 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -8.16318-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.45512+002)	+ J(0.00000)	(-2.74322+000)	+ J(0.00000)	2.23934-004	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(1.11198+001)	+ J(1.62420+002)	1.32896-002	8.60835+001
(-1.04774+001)	+ J(-2.15787+000)	(1.11198+001)	+ J(-1.62420+002)	1.32896-002	-8.60835+001
(-2.42732+000)	+ J(0.00000)	(-8.57056-002)	+ J(0.00000)	6.99630-006	1.80000+002
(-2.22719-001)	+ J(0.00000)	(2.19392-001)	+ J(0.00000)	1.79094-005	0.00000

SENSITIVITY TO 5 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.44088-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.45512+002)	+ J(0.00000)	(6.03968+003)	+ J(0.00000)	8.70274-002	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-3.03934+003)	+ J(-3.35269+004)	4.85064-001	-9.51800+001
(-1.04774+001)	+ J(-2.15787+000)	(-3.03934+003)	+ J(3.35269+004)	4.85064-001	9.51800+001
(-2.42732+000)	+ J(0.00000)	(-2.90056+001)	+ J(0.00000)	4.17936-004	1.80000+002
(-2.22719-001)	+ J(0.00000)	(6.78177+001)	+ J(0.00000)	9.77171-004	1.11022-016

20/30S/).3 OPTIMAL CONTROL DESIGN POINT LPG1

SYSTEMS CONTROL,INC.(VT) -
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SENSITIVITY TO 5 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.13249-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.93512+002)	+ J(0.00000)	(-6.85218+003)	+ J(0.00000)	7.76002+000	1.80000+002
(-1.04774+001)	+ J(2.15757+000)	(-1.15470+002)	+ J(-8.82437+001)	1.64583-001	-1.42613+002
(-1.04774+001)	+ J(-2.15757+000)	(-1.15470+002)	+ J(8.82437+001)	1.64583-001	1.42613+002
(-2.02752+000)	+ J(0.00000)	(2.59714+000)	+ J(0.00000)	2.94123-003	0.00000
(-2.22714-001)	+ J(0.00000)	(5.20162-001)	+ J(0.00000)	5.89101-004	1.11022-016

! SENSITIVITY OF OPTIMAL CONTROLLER DESIGN !

SENSITIVITY TO 1 1 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 2.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-2.15258+001)	+ J(0.00000)	4.30516-003	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(-1.56929+003)	+ J(9.17236+003)	1.86113+000	9.97087+001
(-1.04774+001)	+ J(-2.15787+000)	(-1.56929+003)	+ J(-9.17236+003)	1.86113+000	-9.97087+001
(-2.42732+000)	+ J(0.00000)	(-2.61703+003)	+ J(0.00000)	5.23405-001	1.80000+002
(-2.22719-001)	+ J(0.00000)	(2.30490+001)	+ J(0.00000)	4.60979-003	2.22045-016

SENSITIVITY TO 2 2 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 1.00000-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-7.25506+001)	+ J(0.00000)	7.25506-004	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(-5.13993+003)	+ J(1.14225+004)	1.25256-001	1.14227+002
(-1.04774+001)	+ J(-2.15787+000)	(-5.13993+003)	+ J(-1.14225+004)	1.25256-001	-1.14227+002
(-2.42732+000)	+ J(0.00000)	(1.85808+003)	+ J(0.00000)	1.85808-002	1.11022-016
(-2.22719-001)	+ J(0.00000)	(2.10896+001)	+ J(0.00000)	2.10896-004	1.11022-016

SENSITIVITY TO 3 3 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 2.00000-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-6.11528-004)	+ J(0.00000)	1.22306-005	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(-2.03429-001)	+ J(-8.98355-001)	1.84220-002	-1.02759+002
(-1.04774+001)	+ J(-2.15787+000)	(-2.03429-001)	+ J(8.98355-001)	1.84220-002	1.02759+002
(-2.42732+000)	+ J(0.00000)	(1.44922-003)	+ J(0.00000)	2.89844-005	1.11022-016
(-2.22719-001)	+ J(0.00000)	(-2.35850-003)	+ J(0.00000)	4.71701-005	1.80000+002

SENSITIVITY TO 4 4 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 0.00000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-3.36258+002)	+ J(0.00000)	3.36258+002	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(-1.08712+004)	+ J(-5.17638+004)	5.28930+004	1.01861+002
(-1.04774+001)	+ J(-2.15787+000)	(-1.08712+004)	+ J(5.17638+004)	5.28930+004	1.01861+002
(-2.42732+000)	+ J(0.00000)	(-2.17663+002)	+ J(0.00000)	2.17663+002	1.80000+002
(-2.22719-001)	+ J(0.00000)	(-5.54770+001)	+ J(0.00000)	5.54770+001	1.80000+002

SENSITIVITY TO 5 5 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 8.00000-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(-2.78765+001)	+ J(0.00000)	2.23012+001	1.80000+002
(-1.04774+001)	+ J(2.15787+000)	(-1.99060+000)	+ J(-1.80519+000)	2.14978+000	-1.37797+002
(-1.04774+001)	+ J(-2.15787+000)	(-1.99060+000)	+ J(1.80519+000)	2.14978+000	1.37797+002
(-2.42732+000)	+ J(0.00000)	(5.12096-001)	+ J(0.00000)	4.09677-001	1.11022-016
(-2.22719-001)	+ J(0.00000)	(-2.33560-002)	+ J(0.00000)	1.86848-002	1.80000+002

SENSITIVITY TO 1 1 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(6.89258+004)	+ J(0.00000)	6.89258+000	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(2.39654+004)	+ J(-2.26577+003)	2.40722+000	-5.40089+000
(-1.04774+001)	+ J(-2.15787+000)	(2.39654+004)	+ J(2.26577+003)	2.40722+000	5.40089+000
(-2.42732+000)	+ J(0.00000)	(-2.04859+002)	+ J(0.00000)	2.04859-002	1.80000+002
(-2.22719-001)	+ J(0.00000)	(-5.54550+001)	+ J(0.00000)	5.54550-003	1.80000+002

30/30</0.9 OPTIMAL CONTROL DESIGN POINT LPG1

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SENSITIVITY TO 2 2 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000+002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(1.80356-006)	+ J(0.00000)	3.60711-004	0.00000
(-1.04774+001)	+ J(2.15787+000)	(2.17815-004)	+ J(1.65172-004)	5.46718-002	3.71735+001
(-1.04774+001)	+ J(-2.15787+000)	(2.17815-004)	+ J(-1.65172-004)	5.46718-002	-3.71735+001
(-2.42732+000)	+ J(0.00000)	(2.11128-004)	+ J(0.00000)	4.22257-002	2.22045-016
(-2.22719-001)	+ J(0.00000)	(1.00284-004)	+ J(0.00000)	2.00568-002	2.22045-016

SENSITIVITY TO 3 3 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 4.00000-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(5.75574+001)	+ J(0.00000)	2.30230+000	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-1.77354+000)	+ J(-1.24564+000)	8.66908-002	-1.44918+002
(-1.04774+001)	+ J(-2.15787+000)	(-1.77354+000)	+ J(1.24564+000)	8.66908-002	1.44918+002
(-2.42732+000)	+ J(0.00000)	(3.33257-001)	+ J(0.00000)	1.33303-002	1.11022-016
(-2.22719-001)	+ J(0.00000)	(5.15421-002)	+ J(0.00000)	2.06168-003	1.11022-016

SENSITIVITY TO 4 4 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 4.00000-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.43512+002)	+ J(0.00000)	(1.52311+001)	+ J(0.00000)	6.09242+000	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-4.85613-001)	+ J(-2.68192-001)	2.21900-001	-1.51089+002
(-1.04774+001)	+ J(-2.15787+000)	(-4.85613-001)	+ J(2.68192-001)	2.21900-001	1.51089+002
(-2.42732+000)	+ J(0.00000)	(-5.05978-002)	+ J(0.00000)	2.02391-002	1.80000+002
(-2.22719-001)	+ J(0.00000)	(5.46994-004)	+ J(0.00000)	2.18798-004	1.11022-016

20/30<20.9 OPTIMAL CONTROL DESIGN POINT LPG1

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SENSITIVITY TO 5 5 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000+004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.93512+002)	+ J(0.00000)	(3.51041-004)	+ J(0.00000)	7.02081+000	1.11022-016
(-1.04774+001)	+ J(2.15787+000)	(-1.06458-005)	+ J(-6.79910-006)	2.52635-001	-1.47435+002
(-1.04774+001)	+ J(-2.15787+000)	(-1.06458-005)	+ J(6.79910-006)	2.52635-001	1.47435+002
(-2.02732+000)	+ J(0.00000)	(4.01487-006)	+ J(0.00000)	8.02974-002	1.11022-016
(-2.22719-001)	+ J(0.00000)	(-1.43957-007)	+ J(0.00000)	2.87914-003	1.80000+002

SENSITIVITY OF CLOSED LOOP SYSTEM

SENSITIVITY TO 1 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -2.75676-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(2.49130+000)	+ J(0.00000)	6.86793-002	1.11022-016
(-9.55230+000)	+ J(0.00000)	(6.62185-001)	+ J(0.00000)	1.82549-002	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-5.00204+000)	+ J(-8.36185+001)	2.30928+000	-9.34234+001
(-5.74539+000)	+ J(-6.24817-001)	(-5.00204+000)	+ J(8.36185+001)	2.30928+000	9.34234+001
(-1.94893+000)	+ J(0.00000)	(-4.00414-001)	+ J(0.00000)	1.10385-002	1.80000+002

SENSITIVITY TO 1 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -6.73882-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(3.23809+000)	+ J(0.00000)	2.18209+000	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-4.57027+000)	+ J(0.00000)	3.07983+000	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(1.85319+000)	+ J(1.26347+001)	8.60538+000	8.16557+001
(-5.74539+000)	+ J(-6.24817-001)	(1.85319+000)	+ J(-1.26347+001)	8.60538+000	-8.16557+001
(-1.94893+000)	+ J(0.00000)	(2.00180+000)	+ J(0.00000)	1.34898+000	1.11022-016

SENSITIVITY TO 1 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.12896+001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(2.06140-002)	+ J(0.00000)	2.32723-001	1.11022-016
(-9.55230+000)	+ J(0.00000)	(3.05326-002)	+ J(0.00000)	3.44700-001	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-1.51940-002)	+ J(-8.30594-002)	9.53266-001	-1.00367+002
(-5.74539+000)	+ J(-6.24817-001)	(-1.51940-002)	+ J(8.30594-002)	9.53266-001	1.00367+002
(-1.94893+000)	+ J(0.00000)	(-3.88583-004)	+ J(0.00000)	4.38694-003	1.80000+002

SENSITIVITY TO 1 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -1.23198-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(3.20918-001)	+ J(0.00000)	3.95364-002	1.11022-016
(-9.55230+000)	+ J(0.00000)	(1.62300+001)	+ J(0.00000)	1.99950+000	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-2.56840+000)	+ J(-8.76002+000)	1.12464+000	-1.06341+002
(-5.74539+000)	+ J(-6.24817-001)	(-2.56840+000)	+ J(8.76002+000)	1.12464+000	1.06341+002
(-1.94893+000)	+ J(0.00000)	(-1.41414+000)	+ J(0.00000)	1.74218-001	1.80000+002

SENSITIVITY TO 1 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.51350-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-4.46032+000)	+ J(0.00000)	2.01317+000	1.80000+002
(-9.55230+000)	+ J(0.00000)	(2.05013-002)	+ J(0.00000)	9.25326-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(1.71863-001)	+ J(6.75027-001)	3.14393-001	7.57160+001
(-5.74539+000)	+ J(-6.24817-001)	(1.71863-001)	+ J(-6.75027-001)	3.14393-001	-7.57160+001
(-1.94893+000)	+ J(0.00000)	(4.60945-002)	+ J(0.00000)	2.08048-002	1.11022-016

SENSITIVITY TO 2 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.54718-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(1.42391+003)	+ J(0.00000)	2.20304-002	1.11022-016
(-9.55230+000)	+ J(0.00000)	(9.57771+001)	+ J(0.00000)	1.48184-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-3.37037+003)	+ J(-3.76159+004)	5.84317-001	-9.51201+001
(-5.74539+000)	+ J(-6.24817-001)	(-3.37037+003)	+ J(3.76159+004)	5.84317-001	9.51201+001
(-1.94893+000)	+ J(0.00000)	(5.05989+000)	+ J(0.00000)	7.82855-005	0.00000

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SENSITIVITY TO   2  2 ELEMENT OF C       MATRIX:                    BASELINE PARAMETER VALUE = -1.43977-004

   .........POLE LOCATION..........        ...........................SENSITIVITY............................
      REAL             IMAGINARY               REAL              IMAGINARY          MAGNITUDE          PHASE

(-1.51351+002) + J( 0.00000     )      ( 1.85074+003) + J( 0.00000     )     2.66463-001      1.11022-016
(-9.55230+000) + J( 0.00000     )      (-6.61035+002) + J( 0.00000     )     9.51737-002      1.80000+002
(-5.74539+000) + J( 6.24817-001)       ( 1.00380+003) + J( 5.66908+003)      8.28912-001      7.99591+001
(-5.74539+000) + J(-6.24817-001)       ( 1.00380+003) + J(-5.66908+003)      8.28912-001     -7.99591+001
(-1.94893+000) + J( 0.00000     )      (-2.52961+001) + J( 0.00000     )     3.64205-003      1.80000+002

SENSITIVITY TO   2  3 ELEMENT OF C       MATRIX:                    BASELINE PARAMETER VALUE =  4.79622-003

   .........POLE LOCATION..........        ...........................SENSITIVITY............................
      REAL             IMAGINARY               REAL              IMAGINARY          MAGNITUDE          PHASE

(-1.51351+002) + J( 0.00000     )      ( 1.17819+001) + J( 0.00000     )     5.65088-002      2.22045-016
(-9.55230+000) + J( 0.00000     )      ( 4.41617+000) + J( 0.00000     )     2.11809-002      0.00000
(-5.74539+000) + J( 6.24817-001)       (-7.95591+000) + J(-3.72279+001)      1.82585-001     -1.02063+002
(-5.74539+000) + J(-6.24817-001)       (-7.95591+000) + J( 3.72279+001)      1.82585-001      1.02063+002
(-1.94893+000) + J( 0.00000     )      ( 4.91038-003) + J( 0.00000     )     2.35513-005      0.00000

SENSITIVITY TO   2  4 ELEMENT OF C       MATRIX:                    BASELINE PARAMETER VALUE = -2.52918-005

   .........POLE LOCATION..........        ...........................SENSITIVITY............................
      REAL             IMAGINARY               REAL              IMAGINARY          MAGNITUDE          PHASE

(-1.51351+002) + J( 0.00000     )      ( 1.83421+002) + J( 0.00000     )     4.63906-003      1.11022-016
(-9.55230+000) + J( 0.00000     )      ( 2.34748+003) + J( 0.00000     )     5.93719-002      1.11022-016
(-5.74539+000) + J( 6.24817-001)       (-1.27438+003) + J(-3.91342+003)      1.04093-001     -1.08038+002
(-5.74539+000) + J(-6.24817-001)       (-1.27438+003) + J( 3.91342+003)      1.04093-001      1.08038+002
(-1.94893+000) + J( 0.00000     )      ( 1.73699+001) + J( 0.00000     )     4.51963-004      0.00000
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SENSITIVITY TO 2 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 5.36076-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-2.54930+003)	+ J(0.00000)	1.36662+000	1.80000+002
(-9.55230+000)	+ J(0.00000)	(2.96527+000)	+ J(0.00000)	1.58961-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(8.64608+001)	+ J(3.01907+002)	1.68351-001	7.40193+001
(-5.74539+000)	+ J(-6.24817-001)	(8.64608+001)	+ J(-3.01907+002)	1.68351-001	-7.40193+001
(-1.94893+000)	+ J(0.00000)	(-5.82480-001)	+ J(0.00000)	3.12253-004	1.80000+002

SENSITIVITY TO 3 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 6.28071-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-7.28595+000)	+ J(0.00000)	4.57610-003	1.80000+002
(-9.55230+000)	+ J(0.00000)	(-3.87483-001)	+ J(0.00000)	2.43367-004	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(8.73273+000)	+ J(1.74803+002)	1.09926-001	8.71401+001
(-5.74539+000)	+ J(-6.24817-001)	(8.73273+000)	+ J(-1.74803+002)	1.09926-001	-8.71401+001
(-1.94893+000)	+ J(0.00000)	(1.79811-002)	+ J(0.00000)	1.12934-005	0.00000

SENSITIVITY TO 3 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.66619-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-9.46998+000)	+ J(0.00000)	2.52488-002	1.80000+002
(-9.55230+000)	+ J(0.00000)	(2.67433+000)	+ J(0.00000)	7.13027-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-3.61223+000)	+ J(-2.64352+001)	7.11361-002	-9.77811+001
(-5.74539+000)	+ J(-6.24817-001)	(-3.61223+000)	+ J(2.64352+001)	7.11361-002	9.77811+001
(-1.94893+000)	+ J(0.00000)	(-8.98936-002)	+ J(0.00000)	2.39673-004	1.80000+002

AD-A052 346 SYSTEMS CONTROL INC PALO ALTO CALIF AERONAUTICAL AND--ETC F/G 21/5
F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM. VOLUME II. APPEND--ETC(U)
JUN 77 R L DE HOFF, W E HALL, R J ADAMS F33615-75-C-2053

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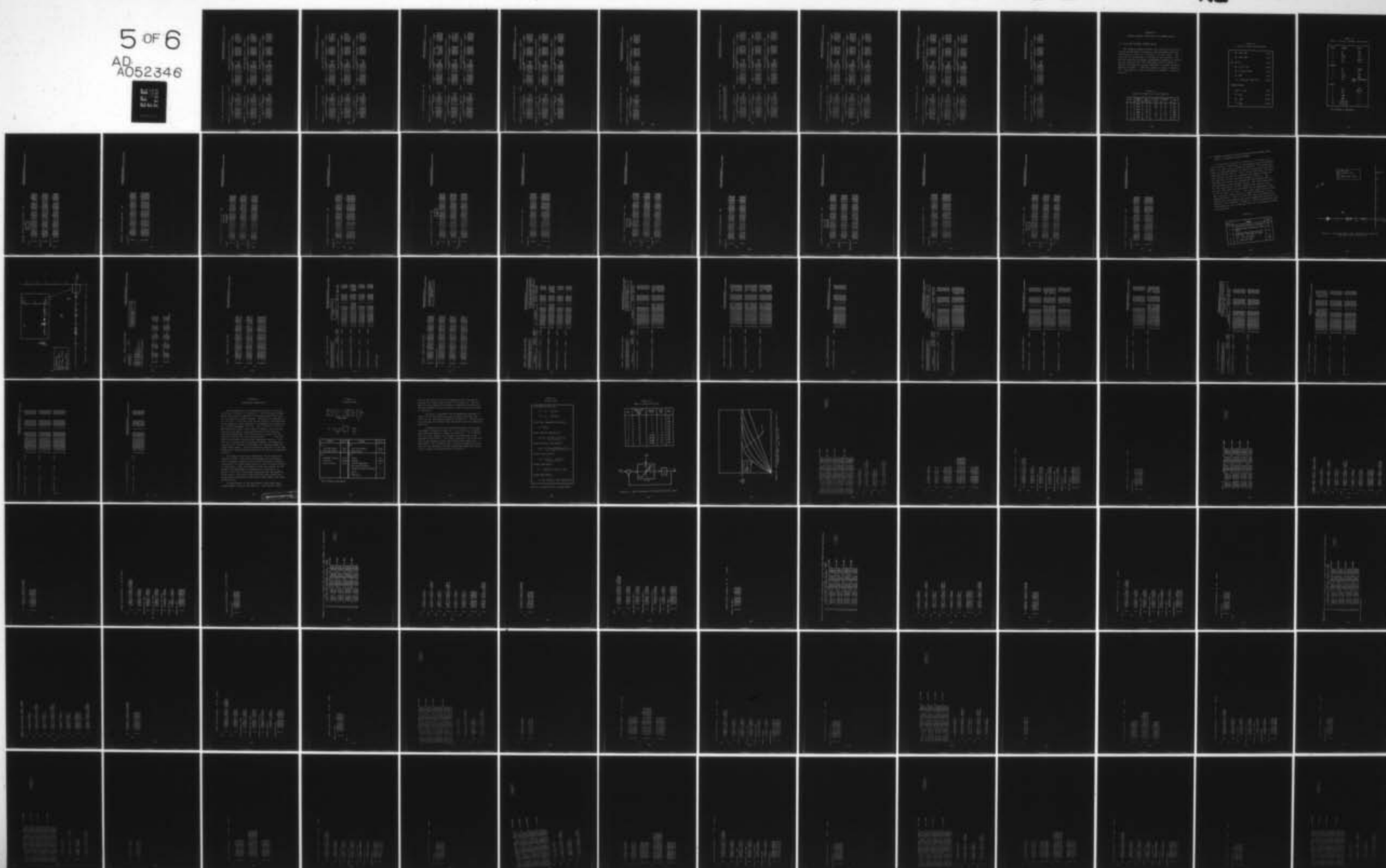

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SENSITIVITY TO   3  3 ELEMENT OF C      MATRIX:                BASELINE PARAMETER VALUE = -5.48160-001

 .........POLE LOCATION..........     ..........................SENSITIVITY...........................
    REAL              IMAGINARY             REAL             IMAGINARY        MAGNITUDE        PHASE

(-1.51351+002) + J( 0.00000     )     (-6.02967-002) + J( 0.00000     )     3.30467-002     1.80000+002
(-9.55230+000) + J( 0.00000     )     (-1.78664-002) + J( 0.00000     )     9.79363-003     1.80000+002
(-5.74539+000) + J( 6.24817-001)      ( 3.00378-002) + J( 1.73845-001)      9.67066-002     8.01970+001
(-5.74539+000) + J(-6.24817-001)      ( 3.00378-002) + J(-1.73845-001)      9.67066-002    -8.01970+001
(-1.94893+000) + J( 0.00000     )     ( 1.74498-005) + J( 0.00000     )     9.56528-006     0.00000

SENSITIVITY TO   3  4 ELEMENT OF C      MATRIX:                BASELINE PARAMETER VALUE =  1.33662-003

 .........POLE LOCATION..........     ..........................SENSITIVITY...........................
    REAL              IMAGINARY             REAL             IMAGINARY        MAGNITUDE        PHASE

(-1.51351+002) + J( 0.00000     )     (-9.38544-001) + J( 0.00000     )     1.25448-003     1.80000+002
(-9.55230+000) + J( 0.00000     )     (-9.49712+000) + J( 0.00000     )     1.26941-002     1.80000+002
(-5.74539+000) + J( 6.24817-001)      ( 5.18608+000) + J( 1.83547+001)      2.54938-002     7.42225+001
(-5.74539+000) + J(-6.24817-001)      ( 5.18608+000) + J(-1.83547+001)      2.54938-002    -7.42225+001
(-1.94893+000) + J( 0.00000     )     ( 6.35036-002) + J( 0.00000     )     8.48804-005     0.00000

SENSITIVITY TO   3  5 ELEMENT OF C      MATRIX:                BASELINE PARAMETER VALUE = -1.62332-002

 .........POLE LOCATION..........     ..........................SENSITIVITY...........................
    REAL              IMAGINARY             REAL             IMAGINARY        MAGNITUDE        PHASE

(-1.51351+002) + J( 0.00000     )     ( 1.30445+001) + J( 0.00000     )     2.11754-001     1.11022-016
(-9.55230+000) + J( 0.00000     )     (-1.19965-002) + J( 0.00000     )     1.94742-004     1.80000+002
(-5.74539+000) + J( 6.24817-001)      (-3.45198-001) + J(-1.41384+000)      2.36253-002     1.03721+002
(-5.74539+000) + J(-6.24817-001)      (-3.45198-001) + J( 1.41384+000)      2.36253-002     1.03721+002
(-1.94893+000) + J( 0.00000     )     (-2.06993-003) + J( 0.00000     )     3.36017-005     1.80000+002
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SENSITIVITY TO 4 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -4.91882-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-2.85947+001)	+ J(0.00000)	1.40652-002	1.80000+002
(-9.55230+000)	+ J(0.00000)	(2.77215-001)	+ J(0.00000)	1.36357-004	0.00000
(-5.74539+000)	+ J(6.24817-001)	(2.12658+001)	+ J(-1.13499+002)	5.67998-002	-7.93879+001
(-5.74539+000)	+ J(-6.24817-001)	(2.12658+001)	+ J(1.13499+002)	5.67998-002	7.93879+001
(-1.94893+000)	+ J(0.00000)	(-5.94235-001)	+ J(0.00000)	2.92293-004	1.80000+002

SENSITIVITY TO 4 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.49538-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-3.71662+001)	+ J(0.00000)	1.29910-002	1.80000+002
(-9.55230+000)	+ J(0.00000)	(-1.91328+000)	+ J(0.00000)	6.68766-004	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(-1.74566+000)	+ J(1.75165+001)	6.15303-003	9.56913+001
(-5.74539+000)	+ J(-6.24817-001)	(-1.74566+000)	+ J(-1.75165+001)	6.15303-003	-9.56913+001
(-1.94893+000)	+ J(0.00000)	(2.97078+000)	+ J(0.00000)	1.03840-003	0.00000

SENSITIVITY TO 4 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 2.98680-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-2.36603-001)	+ J(0.00000)	7.06686-002	1.80000+002
(-9.55230+000)	+ J(0.00000)	(1.27821-002)	+ J(0.00000)	3.81775-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(7.44873-003)	+ J(-1.16159-001)	3.47657-002	-8.63310+001
(-5.74539+000)	+ J(-6.24817-001)	(7.44873-003)	+ J(1.16159-001)	3.47657-002	8.63310+001
(-1.94893+000)	+ J(0.00000)	(-5.76676-004)	+ J(0.00000)	1.72242-004	1.80000+002

SENSITIVITY TO 4 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -7.21163-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-3.68344+000)	+ J(0.00000)	2.6[illegible]-003	1.80000+002
(-9.55230+000)	+ J(0.00000)	(6.79448+000)	+ J(0.00000)	4.89[illegible]-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-5.06196-001)	+ J(-1.25739+001)	9.07516-003	-9.23054+001
(-5.74539+000)	+ J(-6.24817-001)	(-5.06196-001)	+ J(1.25739+001)	9.07516-003	9.23054+001
(-1.94893+000)	+ J(0.00000)	(-2.09865+000)	+ J(0.00000)	1.51347-003	1.80000+002

SENSITIVITY TO 4 5 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -6.17304-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(5.11947+001)	+ J(0.00000)	3.16027-001	1.11022-016
(-9.55230+000)	+ J(0.00000)	(8.58259-003)	+ J(0.00000)	5.29806-005	0.00000
(-5.74539+000)	+ J(6.24817-001)	(4.16555-003)	+ J(9.60204-001)	5.92743-003	8.97515+001
(-5.74539+000)	+ J(-6.24817-001)	(4.16555-003)	+ J(-9.60204-001)	5.92743-003	-8.97515+001
(-1.94893+000)	+ J(0.00000)	(6.84065-002)	+ J(0.00000)	4.22276-004	1.11022-016

SENSITIVITY TO 5 1 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 3.58916-006

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(5.95314+003)	+ J(0.00000)	2.13668-002	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-1.74449+002)	+ J(0.00000)	6.26094-004	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(-1.06390+004)	+ J(4.01647+004)	1.49129-001	1.04836+002
(-5.74539+000)	+ J(-6.24817-001)	(-1.06390+004)	+ J(-4.01647+004)	1.49129-001	-1.04836+002
(-1.94893+000)	+ J(0.00000)	(1.07932+003)	+ J(0.00000)	3.87385-003	1.11022-016

SENSITIVITY TO 5 2 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 1.55660-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.51351+002)	+ J(0.00000)	(7.73765+003)	+ J(0.00000)	1.20444-001	1.11022-016
(-9.55230+000)	+ J(0.00000)	(1.20395+003)	+ J(0.00000)	1.87408-002	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(1.09064+003)	+ J(-6.23939+003)	9.85951-002	-9.00850+001
(-5.74539+000)	+ J(-6.24817-001)	(1.09064+003)	+ J(6.23939+003)	9.85951-002	9.00850+001
(-1.94893+000)	+ J(0.00000)	(-5.39588+003)	+ J(0.00000)	8.39923-002	1.80000+002

SENSITIVITY TO 5 3 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = -3.87933-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.51351+002)	+ J(0.00000)	(4.92585+001)	+ J(0.00000)	1.91090-002	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-8.04325+000)	+ J(0.00000)	3.12024-003	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(-5.75134+000)	+ J(4.14853+001)	1.62474-002	9.78930+001
(-5.74539+000)	+ J(-6.24817-001)	(-5.75134+000)	+ J(-4.14853+001)	1.62474-002	-9.78930+001
(-1.94893+000)	+ J(0.00000)	(1.04743+000)	+ J(0.00000)	4.06331-004	1.11022-016

SENSITIVITY TO 5 4 ELEMENT OF C MATRIX: BASELINE PARAMETER VALUE = 4.49248-006

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	SENSITIVITY MAGNITUDE	SENSITIVITY PHASE
(-1.51351+002)	+ J(0.00000)	(7.66857+002)	+ J(0.00000)	3.44509-003	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-4.27550+003)	+ J(0.00000)	1.92076-002	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(-1.51587+002)	+ J(4.52544+003)	2.03418-002	9.19186+001
(-5.74539+000)	+ J(-6.24817-001)	(-1.51587+002)	+ J(-4.52544+003)	2.03418-002	-9.19186+001
(-1.94893+000)	+ J(0.00000)	(3.81182+003)	+ J(0.00000)	1.71245-002	1.11022-016

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20/0K/0   OPTIMAL CONTROL DESIGN POINT  LPG2                                  SYSTEMS CONTROL,INC.(VT) -
                                                                               TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO   5  5 ELEMENT OF C       MATRIX:                 BASELINE PARAMETER VALUE =  4.09087-005

   .........POLE LOCATION..........         ...........................SENSITIVITY...........................
      REAL              IMAGINARY                  REAL              IMAGINARY          MAGNITUDE         PHASE

   (-1.51351+002) + J( 0.00000     )        (-1.06583+004) + J( 0.00000     )      4.36015-001      1.80000+002
   (-9.55230+000) + J( 0.00000     )        (-5.40069+000) + J( 0.00000     )      2.20935-004      1.80000+002
   (-5.74539+000) + J( 6.24817-001)         ( 2.39524+001) + J(-3.44671+002)       1.41341-002     -8.60248+001
   (-5.74539+000) + J(-6.24817-001)         ( 2.39524+001) + J( 3.44671+002)       1.41341-002      8.60248+001
   (-1.94893+000) + J( 0.00000     )        (-1.24248+002) + J( 0.00000     )      5.08282-003      1.80000+002

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SENSITIVITY OF OPTIMAL CONTROLLER DESIGN

SENSITIVITY TO 1 1 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 1.00000-005

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(1.86639+003)	+ J(0.00000)	1.86639-002	1.11022-016
(-9.55230+000)	+ J(0.00000)	(1.45802+003)	+ J(0.00000)	1.45802-002	2.22045-016
(-5.74539+000)	+ J(6.24817-001)	(-4.78652+004)	+ J(-1.30202+005)	1.38721+000	-1.10185+002
(-5.74539+000)	+ J(-6.24817-001)	(-4.78652+004)	+ J(1.30202+005)	1.38721+000	1.10185+002
(-1.94893+000)	+ J(0.00000)	(2.11519+003)	+ J(0.00000)	2.11519-002	1.11022-016

SENSITIVITY TO 2 2 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 1.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-9.21384+002)	+ J(0.00000)	9.21384-002	1.80000+002
(-9.55230+000)	+ J(0.00000)	(6.46910+003)	+ J(0.00000)	6.46910-001	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(-2.47343+003)	+ J(-2.88237+004)	2.89296+000	-9.49048+001
(-5.74539+000)	+ J(-6.24817-001)	(-2.47343+003)	+ J(2.88237+004)	2.89296+000	9.49048+001
(-1.94893+000)	+ J(0.00000)	(-7.43718+003)	+ J(0.00000)	7.43718-001	1.80000+002

SENSITIVITY TO 3 3 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 5.00000-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-1.04796-002)	+ J(0.00000)	5.23979-004	1.80000+002
(-9.55230+000)	+ J(0.00000)	(-2.21691-002)	+ J(0.00000)	1.10845-003	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(-3.09383-002)	+ J(-7.31255-002)	3.97005-003	-1.12933+002
(-5.74539+000)	+ J(-6.24817-001)	(-3.09383-002)	+ J(7.31255-002)	3.97005-003	1.12933+002
(-1.94893+000)	+ J(0.00000)	(2.27977-003)	+ J(0.00000)	1.13988-004	1.11022-016

SENSITIVITY TO 4 4 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 0.00000

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-1.92229+002)	+ J(0.00000)	1.92229+002	1.80000+002
(-9.55230+000)	+ J(0.00000)	(-7.08890+004)	+ J(0.00000)	7.08890+004	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(1.17897+004)	+ J(4.43157+004)	4.58571+004	7.51022+001
(-5.74539+000)	+ J(-6.24817-001)	(1.17897+004)	+ J(-4.43157+004)	4.58571+004	-7.51022+001
(-1.94593+000)	+ J(0.00000)	(7.89943+003)	+ J(0.00000)	7.89943+003	1.11022-016

SENSITIVITY TO 5 5 ELEMENT OF A MATRIX: BASELINE PARAMETER VALUE = 8.00000-003

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(-8.35461+002)	+ J(0.00000)	6.68359+000	1.80000+002
(-9.55230+000)	+ J(0.00000)	(9.33026-001)	+ J(0.00000)	7.46421-003	1.11022-016
(-5.74539+000)	+ J(6.24817-001)	(1.07909+001)	+ J(-8.10883+000)	1.07984-001	-3.69230+001
(-5.74539+000)	+ J(-6.24817-001)	(1.07909+001)	+ J(8.10883+000)	1.07984-001	3.69230+001
(-1.94593+000)	+ J(0.00000)	(-8.00686+000)	+ J(0.00000)	6.40549-002	1.80000+002

SENSITIVITY TO 1 1 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000-004

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(4.38459+004)	+ J(0.00000)	4.38459+000	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-6.20598+003)	+ J(0.00000)	6.20598-001	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(4.76278+003)	+ J(3.07098+004)	3.10769+000	8.11843+001
(-5.74539+000)	+ J(-6.24817-001)	(4.76278+003)	+ J(-3.07098+004)	3.10769+000	-8.11843+001
(-1.94593+000)	+ J(0.00000)	(7.60014+003)	+ J(0.00000)	7.60014-001	0.00000

SENSITIVITY TO 2 2 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 1.00000+002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(1.51414-002)	+ J(0.00000)	1.51414+000	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-4.47275-004)	+ J(0.00000)	4.47275-002	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(1.45254-003)	+ J(1.17611-002)	1.18505+000	8.29595+001
(-5.74539+000)	+ J(-6.24817-001)	(1.45254-003)	+ J(-1.17611-002)	1.18505+000	-8.29595+001
(-1.94893+000)	+ J(0.00000)	(-1.41390-004)	+ J(0.00000)	1.41390-002	1.80000+002

SENSITIVITY TO 3 3 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000-002

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(1.02141+001)	+ J(0.00000)	2.04282-001	1.11022-016
(-9.55230+000)	+ J(0.00000)	(-1.47840-001)	+ J(0.00000)	2.95680-003	1.80000+002
(-5.74539+000)	+ J(6.24817-001)	(3.58210-001)	+ J(3.74589-001)	1.03659-002	4.62805+001
(-5.74539+000)	+ J(-6.24817-001)	(3.58210-001)	+ J(-3.74589-001)	1.03659-002	-4.62805+001
(-1.94893+000)	+ J(0.00000)	(-3.30137-002)	+ J(0.00000)	6.60275-004	1.80000+002

SENSITIVITY TO 4 4 ELEMENT OF B MATRIX: BASELINE PARAMETER VALUE = 2.00000-001

POLE LOCATION REAL	POLE LOCATION IMAGINARY	SENSITIVITY REAL	SENSITIVITY IMAGINARY	MAGNITUDE	PHASE
(-1.51351+002)	+ J(0.00000)	(1.74947+000)	+ J(0.00000)	3.49894-001	1.11022-016
(-9.55230+000)	+ J(0.00000)	(4.23190-005)	+ J(0.00000)	8.46380-006	0.00000
(-5.74539+000)	+ J(6.24817-001)	(2.28429-002)	+ J(-3.60265-002)	8.53161-003	-5.76230+001
(-5.74539+000)	+ J(-6.24817-001)	(2.28429-002)	+ J(3.60265-002)	8.53161-003	5.76230+001
(-1.94893+000)	+ J(0.00000)	(-2.03658-005)	+ J(0.00000)	4.07316-006	1.80000+002

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20/0K/0   OPTIMAL CONTROL DESIGN POINT  LPG2                                    SYSTEMS CONTROL,INC.(VT) -
                                                                                 TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

SENSITIVITY TO   5  5 ELEMENT OF B      MATRIX:                          BASELINE PARAMETER VALUE =  1.00000+004

   ..........POLE LOCATION...........       ..........................SENSITIVITY...........................
      REAL              IMAGINARY                REAL              IMAGINARY           MAGNITUDE         PHASE

   (-1.51351+002) + J( 0.00000      )       ( 3.05453-005) + J( 0.00000      )       3.05453-001      0.00000
   (-9.55230+000) + J( 0.00000      )       ( 3.61143-008) + J( 0.00000      )       3.61143-004      1.11022-016
   (-5.74539+000) + J( 6.24917-001)         ( 8.01346-007) + J( 5.95755-007)         9.98538-003      3.66287+001
   (-5.74539+000) + J(-6.24917-001)         ( 8.01346-007) + J(-5.95755-007)         9.98538-003     -3.66287+001
   (-1.94633+000) + J( 0.00000      )       ( 4.13745-006) + J( 0.00000      )       4.13745-002      1.11022-016
```

APPENDIX G

INTEGRAL CONTROL DESIGN DATA AND EXAMPLE DESIGN

G.1 DATA FOR INTEGRAL CONTROL DESIGN

The integral control designs were carried out at the six control design points according to the procedure described in Sections 4.6 and 5.8.3 of Volume I of this report. The data used in the designs is included in this section. The matrices used in the general development presented in Section 4.6 are shown here for the conditions listed in Table G.1. Table G.2 reviews the general equations to define the matrix outputs presented. A specific example is shown in Section G.2. The order of states, outputs and controls is given in Table G.3.

Table G.1
Index of Steady-State Gain Matrices

CASE	DESIGN POINT	PLA (DEG)	ALTITUDE (FT)	MACH NO. (-)	PAGE
1	HPG1	83	45K	0.9	392
2	HPG2	83	30K	0.9	394
3	HPG3	83	0	0	396
4	HPG4	83	0	1.2	398
5	LPG1	20	30K	0.9	400
6	LPG2	20	0	0	402

Table G.2
Integral Design Relationships

$\delta\dot{x} = F\delta x + G\delta u$	(G.1)
$\delta y = H\delta x + D\delta y$	(G.2)
For $\delta\dot{x} = 0,$	(G.3)
$\delta u = C_x\ \delta x + \delta u'$	(G.4)
$\delta x = -(F + GC)^{-1}\ G\delta u'$	(G.5)
$\delta y = \overline{H}\delta u'$	(G.6)
$\overline{H} = -(H + DC_x)(F + GC_x)^{-1}G + D$	(G.7)
Integral System	
$\delta y_S = y - y_{SP}$	(G.8)
$\dot{b} = \delta y_S$	(G.9)
$\delta u' = C_b b$	(G.10)
$\dot{b} = \overline{H}C_b b$	(G.11)

Table G.3

Order of States, Outputs, and Controls

STATE	SYMBOL	UNITS
1	N_1	RPM
2	N_2	RPM
3	PT6M	PSI
4	WF	LBM/HR
5	PT4	PSI
CONTROL		
1	WF	LBM/HR
2	AJ	FT^2
3	CIVV	DEG
4	RCVV	DEG
5	BLD	FRACT. COMPRESSOR FLOW
OUTPUT		
1	FN	LBF
2	WCF	LBM/SEC
3	TT4	°R
4	SMAF	---
5	SMHC	---
6*	$(\Delta p/p)_{EXP}$	---
7*	$(\Delta p/p)_{AVG}$	---

*Not included in some models

83/0.9/45K OPTIMAL CONTROL DESIGN POINT HPG1

SYSTEMS CONTROL, INC. (VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

CASE 1

F+GC

	1	2	3	4	5
1	-7.6831-001	-1.2760-001	-1.0871+003	1.5061+000	1.4055+002
2	1.1874+000	-1.4418+000	-2.0423+002	9.8903-002	1.0389+002
3	1.2094-002	-5.1019-003	-1.0293+001	7.2067-003	5.4553-001
4	-7.2996+000	-1.1293+001	-3.6698+001	-1.3477+001	4.4277+001
5	-1.3463+000	1.1781+000	4.7737+002	1.0526+000	-2.6144+002

$(F+GC)^{-1}$

	1	2	3	4	5
1	-3.2351-001	6.7577-002	2.8663+001	-2.7509-002	-9.1918-002
2	-8.2375-002	-7.0191-001	8.2923+000	-3.4271-002	-3.1173-001
3	-4.5099-005	8.2340-004	-1.0505-001	-4.9284-005	7.5412-005
4	2.5169-001	5.5003-001	-2.3491+001	-3.1198-002	2.9960-001
5	2.2258-003	2.0714-004	-3.9664-001	-2.2838-004	-3.4124-003

$(F+GC)^{-1}G$

	1	2	3	4	5
1	-1.8668-001	-4.5501+002	1.3743+001	-1.7989+000	1.2425+003
2	-2.6569-001	-1.4172+002	-5.4008+000	5.5897+000	5.8668+002
3	-4.0156-004	2.2535+000	5.0975-003	-2.4256-003	4.7362+000
4	-4.2223-001	3.8573+002	-3.0988+000	-3.8325+000	-1.0154+003
5	-1.5451-003	8.1130+000	-5.0883-002	-3.9379-002	7.4850+001

$(F+GC)^{-1}G$

	1	2	3	4	5
1	1.8668-001	4.5501+002	-1.3743+001	1.7989+000	-1.2425+003
2	2.6569-001	1.4172+002	5.4008+000	-5.5897+000	-6.8668+002
3	4.0156-004	-2.2535+000	-5.0975-003	2.4256-003	-4.7362+000
4	4.2223-001	-3.8573+002	3.0988+000	3.8325+000	1.0154+003
5	1.5451-003	-8.1130+000	5.0883-002	3.9379-002	-7.4850+001

$\bar{H}$

	1	2	3	4	5
1	1.1900-002	2.1792+001	3.4522+000	1.5263+000	-6.9023+001
2	8.9704-004	2.1162+000	1.2123-001	8.9635-003	-3.5414+000
3	1.7880-001	3.4736+001	1.3378+000	1.8116+000	2.4826+003
4	2.1257-005	2.4890-001	-1.7384-003	4.1239-004	6.0767-001
5	4.0457-005	-7.6916-002	5.5148-005	-2.5857-003	2.5617-001
6	-1.9941-005	1.5860-001	1.0446-003	-1.7131-004	3.2194-001
7	-1.3333-006	4.6121-002	4.9299-004	7.7515-007	7.9519-002

CASE 2

F+GC

	1	2	3	4	5
1	-1.1700+000	-2.1283+000	-4.6145+002	-6.6415-001	3.6321+002
2	6.0230-001	-1.7222+000	-2.9805+002	1.6164+000	5.7133+001
3	3.2257-002	5.1661-003	-1.3525+001	1.5105-002	-3.4389-001
4	-4.1529+000	-1.[illegible]+001	-1.3411+002	-1.5824+001	9.6676+001
5	-1.3556+000	1.6945+000	1.9678+002	1.0593+000	-5.0500+002

$(F+GC)^{-1}$

	1	2	3	4	5
1	-3.6966-001	8.3001-002	6.8802+000	1.3288-002	-2.5857-001
2	7.3761-002	-3.2151-001	5.0429+000	-3.0953-002	6.9787-003
3	-8.4917-006	4.6607-004	-6.2693-002	-1.1009-005	-5.1721-004
4	2.5720-002	3.0269-001	-7.2922+000	-3.2471-002	5.6018-002
5	9.6256-008	-4.1154-004	-4.1273-002	-2.1193-004	-1.3467-003

$(F+GC)^{-1}G$

	1	2	3	4	5
1	-1.3330-001	-[illegible]+002	1.5599+001	-4.5591+000	5.1823+002
2	-1.3065-001	-2.[illegible]+002	-1.8640+000	7.6836+000	1.8217+003
3	-2.5196-004	3.3[illegible]+000	2.7355-002	-1.0229-002	2.8641+000
4	-4.3920-001	[illegible]+002	-1.7551+000	-7.7537+000	-1.4971+003
5	-6.9337-004	5.[illegible]+000	7.1701-002	-4.1081-002	1.2216+002

$-(F+GC)^{-1}G$

	1	2	3	4	5
1	1.3330-001	4.9146+002	-1.5599+001	4.5591+000	-5.1823+002
2	1.3965-001	2.9810+002	1.8640+000	-7.6836+000	-1.8217+003
3	2.5196-004	-3.3229+000	-2.7355-002	1.0229-002	-2.8641+000
4	4.3920-001	-4.7697+002	1.7551+000	7.7537+000	1.4971+003
5	6.9337-004	-5.[illegible]+000	-7.1701-002	4.1081-002	-1.2216+002

$\overline{H}$

	1	2	3	4	5
1	-2.0271-001	6.5217+002	1.7657+000	7.6374+000	6.6984+003
2	1.1245-003	4.1[illegible]+000	2.3205-001	3.7162-002	-2.7606+000
3	5.2696-002	6.9765+001	8.9716-001	3.3491+000	3.1094+003
4	1.2824-005	2.9313-001	1.6207-003	9.7613-004	1.0237+000
5	4.0669-005	-1.3556-001	2.0608-005	-2.7229-003	-8.0035-001
6	-1.7687-005	2.[illegible]-001	1.4425-003	2.6853-004	1.0769+000
7	-1.5443-006	6.01[illegible]-002	5.5667-004	8.4227-005	2.6352-001

CASE 3

F+GC

	1	2	3	4	5
1	-3.9591+000	-5.2126-001	-7.5624+002	8.0724-001	1.8914+002
2	1.4770+000	-6.9107+000	-2.1068+002	2.3519-001	9.4269+001
3	4.2382-002	-2.4520-002	-1.4397+001	5.7035-003	5.2383-001
4	-5.1065+000	-1.9664+001	-3.0051+002	-1.2407+001	2.8550+001
5	-1.8304+000	2.7275+000	3.6324+002	4.9321-001	-3.4951+002

$(F+GC)^{-1}$

	1	2	3	4	5
1	-1.4499-001	-1.3380-002	6.1581+000	-9.7836-003	-7.3639-002
2	-1.2307-002	-1.6310-001	1.9638+000	-5.0512-003	-4.9469-002
3	-3.5554-004	3.3060-004	-5.9498-002	-5.2036-005	-1.9666-004
4	8.8559-002	2.6000-001	-4.3697+000	-6.7707-002	1.0597-001
5	4.1875-004	-5.3120-004	-8.4927-002	-1.3780-004	-2.9163-003

$(F+GC)^{-1}G$

	1	2	3	4	5
1	-1.0930-001	-6.1678+002	1.9767+001	-3.4724+000	9.6179+002
2	-9.7314-002	-3.3667+002	-5.2661-001	7.3693+000	1.4041+003
3	-2.5785-004	6.4307+000	1.0768-002	-9.1266-003	1.1880+001
4	-6.0426-001	6.4296+002	-7.6526+000	-1.0203+001	-2.4278+003
5	-9.3250-004	7.2567+000	-3.5711-002	-1.2721-001	1.9924+002

$-(F+GC)^{-1}G$

	1	2	3	4	5
1	1.0930-001	6.1678+002	-1.9767+001	3.4724+000	-9.6179+002
2	9.7314-002	3.3467+002	5.2661-001	-7.3693+000	-1.4041+003
3	2.5785-004	-6.4307+000	-1.0768-002	9.1266-003	-1.1880+001
4	6.0426-001	-6.4296+002	7.6528+000	1.0203+001	2.4278+003
5	9.3250-004	-7.2507+000	3.5711-002	1.2721-001	-1.9924+002

$\overline{H}$

	1	2	3	4	5
1	8.1398-002	-3.72[illegible]+001	1.3275+001	7.3687+000	2.7915+003
2	1.5873-003	8.6560+000	4.0832-001	4.9499-002	-1.2867+001
3	8.0380-002	1.3147+002	-2.2891-001	1.3421+000	2.3364+003
4	7.2722-006	1.3339-001	-7.1345-003	2.4916-004	1.6088-001
5	1.1955-005	-5.7735-002	2.7967-004	-2.1896-003	1.8820-002
6	-2.8163-006	1.1294-001	8.3497-004	-3.3480-005	2.6836-001
7	7.7560-007	3.5529-002	3.9450-004	2.9123-005	5.3197-002

CASE 4

F+GC

	1	2	3	4	5
1	-8.8405+000	8.1274-001	-5.3711+002	6.2353-001	1.7317+002
2	-2.2707+000	-9.6698+000	2.4385+002	-2.6698-001	7.2114+001
3	2.2403-002	-1.5812-002	-1.3092+001	1.1802-002	4.3210-001
4	-1.1005+001	-2.6511+001	1.6571+002	-1.3546+001	8.0709+001
5	2.7533+000	7.3897+000	-9.4233+001	1.1023+000	-2.8236+002

$(F+GC)^{-1}$

	1	2	3	4	5
1	-1.0478-001	-5.3664-002	3.7497+000	-6.5274-003	-7.4093-002
2	1.6490-002	-1.1200-001	-2.6130+000	-1.1675-003	-2.2824-002
3	-1.6659-004	1.8389-004	-6.5665-002	-8.3309-005	-1.7955-004
4	4.8784-002	2.4993-001	1.2312+000	-6.9258-002	7.5838-002
5	-3.4410-004	-2.5405-003	-5.0341-003	-3.3678-004	-4.5055-003

$(F+GC)^{-1}G$

	1	2	3	4	5
1	-6.7656-002	-5.2043+002	2.4129+001	-1.1999+001	2.9701+003
2	-6.8267-002	9.8629+001	-8.3581-001	8.5615+000	2.1051+003
3	-4.6009-004	9.6301+000	-4.3604-002	1.0833-003	2.5902+001
4	-5.7127-001	3.5475+002	-2.2544+001	-1.0463+001	-3.4225+003
5	-2.6870-003	1.1846+000	-6.7781-001	-5.8262-001	4.6899+002

$(F+GC)^{-1}G$

	1	2	3	4	5
1	6.7656-002	5.2043+002	-2.4129+001	1.1999+001	-2.9701+003
2	6.8267-002	-9.8629+001	8.3581-001	-8.5615+000	-2.1051+003
3	4.6009-004	-9.6301+000	4.3604-002	-1.0833-003	-2.5902+001
4	5.7127-001	-3.5475+002	2.2544+001	1.0463+001	3.4225+003
5	2.6870-003	-1.1846+000	6.7781-001	5.8262-001	-4.6899+002

$\overline{H}$

	1	2	3	4	5
1	2.0068-001	-6.9564+002	-1.3510+000	-1.8840+001	2.6397+003
2	2.5432-003	1.9115+001	1.0444+000	4.2099-001	-8.8645+001
3	5.1803-002	2.9930+001	-1.7080+000	-2.4829+000	1.8564+003
4	1.7681-006	1.8655-002	-6.5249-003	1.0600-003	-1.2037-001
5	1.2624-005	-4.5492-002	1.7033-003	-2.5448-003	5.6158-002

CASE 5

F+GC

	1	2	3	4	5
1	-8.5898-001	6.0351-001	-5.0890+002	1.3400+000	1.2991+002
2	3.1813-001	-1.0040+000	-1.5458+002	2.4150+000	3.9185+001
3	1.0298-002	-3.4616-003	-7.6093+000	1.3738-002	3.5829-001
4	-5.7468+000	-1.4220+001	1.4280+002	-1.6911+001	8.8628+001
5	3.1449-001	2.3255+000	9.3940+001	1.5983+000	-1.3937+002

$(F+GC)^{-1}$

	1	2	3	4	5
1	-4.7262-001	-2.1575-001	2.8272+001	-9.1276-002	-4.8654-001
2	1.2421-001	-3.4413-001	-2.2634+000	-4.2467-002	-1.3861-002
3	-5.2795-004	4.2679-004	-1.1696-001	-1.4949-004	-7.6952-004
4	5.8642-002	3.5651-001	-9.5257+000	1.0751-003	1.3109-001
5	1.3226-003	-1.8570-003	-1.6238-001	-1.0029-003	-7.5195-003

$(F+GC)^{-1}G$

	1	2	3	4	5
1	-4.2304-001	-4.4669+002	9.7083-001	-1.2066+001	9.1453+002
2	-2.9404-001	4.2211+001	4.2073-001	5.5844+000	1.1752+003
3	-8.9285-004	1.7903+000	-6.6133-003	-1.6305-002	3.9842+000
4	-2.4007-001	1.4710+002	-9.9315-001	-1.6506+000	-9.2429+002
5	-6.1467-003	2.9775+000	-4.8394-002	-1.7505-001	6.5074+001

$(F+GC)^{-1}G$

	1	2	3	4	5
1	4.2304-001	4.4669+002	-9.7083-001	1.2066+001	-9.1453+002
2	2.9404-001	-4.2211+001	-4.2073-001	-5.5644+000	-1.1752+003
3	8.9285-004	-1.7993+000	6.6133-003	1.6305-002	-3.9842+000
4	2.4007-001	-1.4710+002	9.9315-001	1.6506+000	9.2429+002
5	6.1467-003	-2.9775+000	4.8394-002	1.7505-001	-6.5074+001

$\overline{H}$

	1	2	3	4	5
1	6.6046-002	-5.6247+002	2.0432+000	4.2270+000	-9.9857+002
2	4.0842-003	5.9831+000	7.5973-002	1.3814-001	-7.6353+000
3	-2.5419-003	-1.2684+002	2.9465-001	-8.8488-001	1.6702+003
4	1.0044-005	1.1504-001	-4.5341-003	1.8796-003	-9.8800-002
5	3.5866-006	1.5416-002	5.5533-005	-6.5025-003	5.7449-001
6	-3.6730-005	1.7037-001	-4.2209-004	2.0066-004	2.5959-001
7	-1.7624-006	4.4295-002	7.2864-005	1.9878-004	4.5366-002

CASE 6

$F+GC$

	1	2	3	4	5
1	6.4650-001	7.1792+000	-6.1859+003	1.3164+001	6.2468+001
2	-1.9784+000	-8.3812+000	3.1155+003	-5.5979+000	1.1668+002
3	-2.0329-003	-3.5045-002	-5.1898-001	-2.7622-002	6.6849-001
4	-2.7568-001	-5.7388+000	-1.1290+002	-1.1232+001	4.5135+000
5	1.6729+000	8.2678+000	-2.3664+003	6.8963+000	-1.5486+002

$(F+GC)^{-1}$

	1	2	3	4	5
1	-3.8948-001	-3.0256-001	2.3009+002	-5.0717-001	5.9338-001
2	1.4962-002	-4.9041-001	-7.1220+001	2.5612-002	-6.7021-001
3	-1.8506-004	-1.1488-004	2.0080-002	-2.5941-004	-8.2094-005
4	2.2498-003	2.9700-001	3.6892+001	-9.1030-002	3.8130-001
5	-4.7990-004	-1.4469-002	1.8815-002	-4.2003-003	-1.7595-002

$(F+GC)^{-1}G$

	1	2	3	4	5
1	-1.2880+000	-2.6987+002	3.6152+000	-1.1098+001	4.5881+003
2	-7.3493-001	-6.3285+001	8.2413-002	1.7748-001	1.9628+003
3	-1.0135-003	8.0156-001	-1.5701-003	-6.3876-003	3.5099+000
4	-4.1972-001	3.5486+001	-1.2963-001	9.3575-002	-1.2919+003
5	-3.0199-002	-1.6178+000	-1.8006-002	-3.3976-001	1.1360+002

$-(F+GC)^{-1}G$

	1	2	3	4	5
1	1.2880+000	2.6987+002	-3.6152+000	1.1098+001	-4.5881+003
2	7.3493-001	6.3285+001	-8.2413-002	-1.7748-001	-1.9828+003
3	1.0135-003	-8.0159-001	1.5701-003	6.3876-003	-3.5099+000
4	4.1972-001	-3.5886+001	1.2963-001	-9.3575-002	1.2919+003
5	3.0199-002	1.6178+000	1.8000-002	3.3976-001	-1.1360+002

$\overline{H}$

	1	2	3	4	5
1	8.9527-001	-2.4131+002	1.1217+000	4.6356+000	-3.0746+003
2	9.6806-003	4.7218+000	4.2511-002	1.9608-001	-6.2653+001
3	3.3914-001	-2.2753+001	-1.6946-001	-3.7149+000	1.2921+003
4	-4.4576-004	-6.6191-003	-3.9265-003	-2.1715-004	6.6431-001
5	-7.3479-004	-1.6448-002	3.1130-004	1.5020-003	2.1648+000
6	-2.3133-004	1.4067-002	-2.5380-004	1.1671-004	1.3998-001
7	-2.5698-005	5.9737-003	3.7069-005	1.1354-004	-3.2383-002

G.2 EXAMPLE OF DESIGN CYCLE WITH VERIFICATION SHOWING EIGENVALUES OF AUGMENTED LINEAR SYSTEMS

The procedure discussed in Section 5.8.3 (Volume I) is used to design a controller for one design point, intermediate power, sea level static conditions (83/0/0). The design proceeds by using LQR methods to produce an acceptable transient regulator design (Step 1). Next, the sensitivities of closed-loop response are used to eliminate gain elements which are not important in the controlled response (Step 2). The integral trim designs are produced and the integral poles are augmented to the original system. The closed-loop poles for the simplified transient regulator and each of three possible trim modes are calculated for the augmented linear system in Steps 3, 4, and 5. This final check assures acceptable stability with an accurate linear description of the augmented plant. Table G.4 lists the steps and indexes the tabular data representing the actual eigenvalue locations calculated by the software. Figures G.1 and G.2 graphically show the movement of the closed-loop roots as the design and evaluation proceeds.

Table G.4

STEP	COMMENT	PAGE
1	Baseline LQR synthesis at 83/0K/0	407
2	Regulator matrix reduced by eight terms	411
3	Augmented system with five integral roots - N_1 -$\Delta p/p$ trim mode	412
4	FTIT - $\Delta p/p$ trim mode	415
5	P_B - $\Delta p/p$ trim mode	418

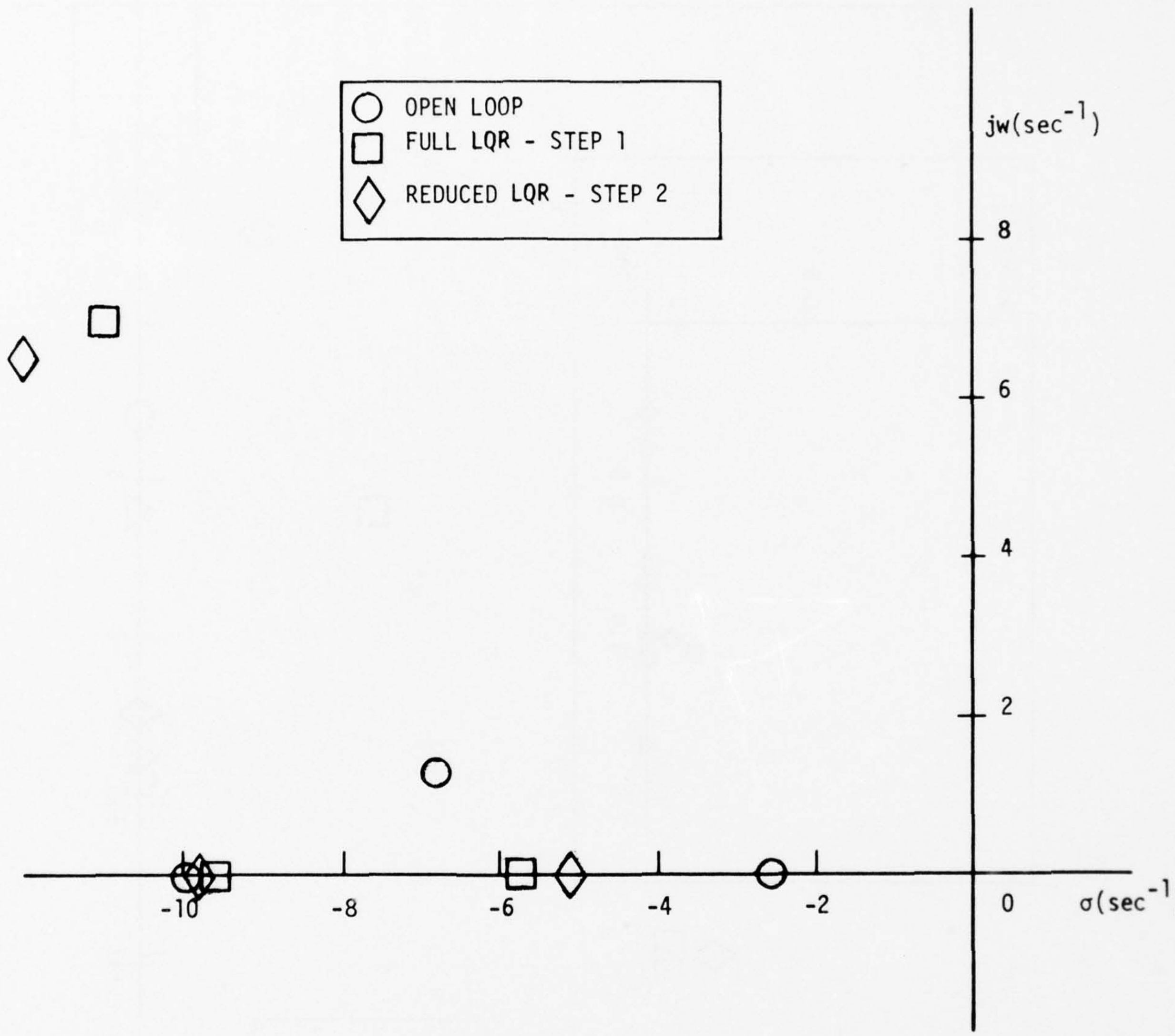


Figure G.1 Open-Loop Poles, Full LQR Poles and Simplified LQR Poles (Step 1 and Step 2)

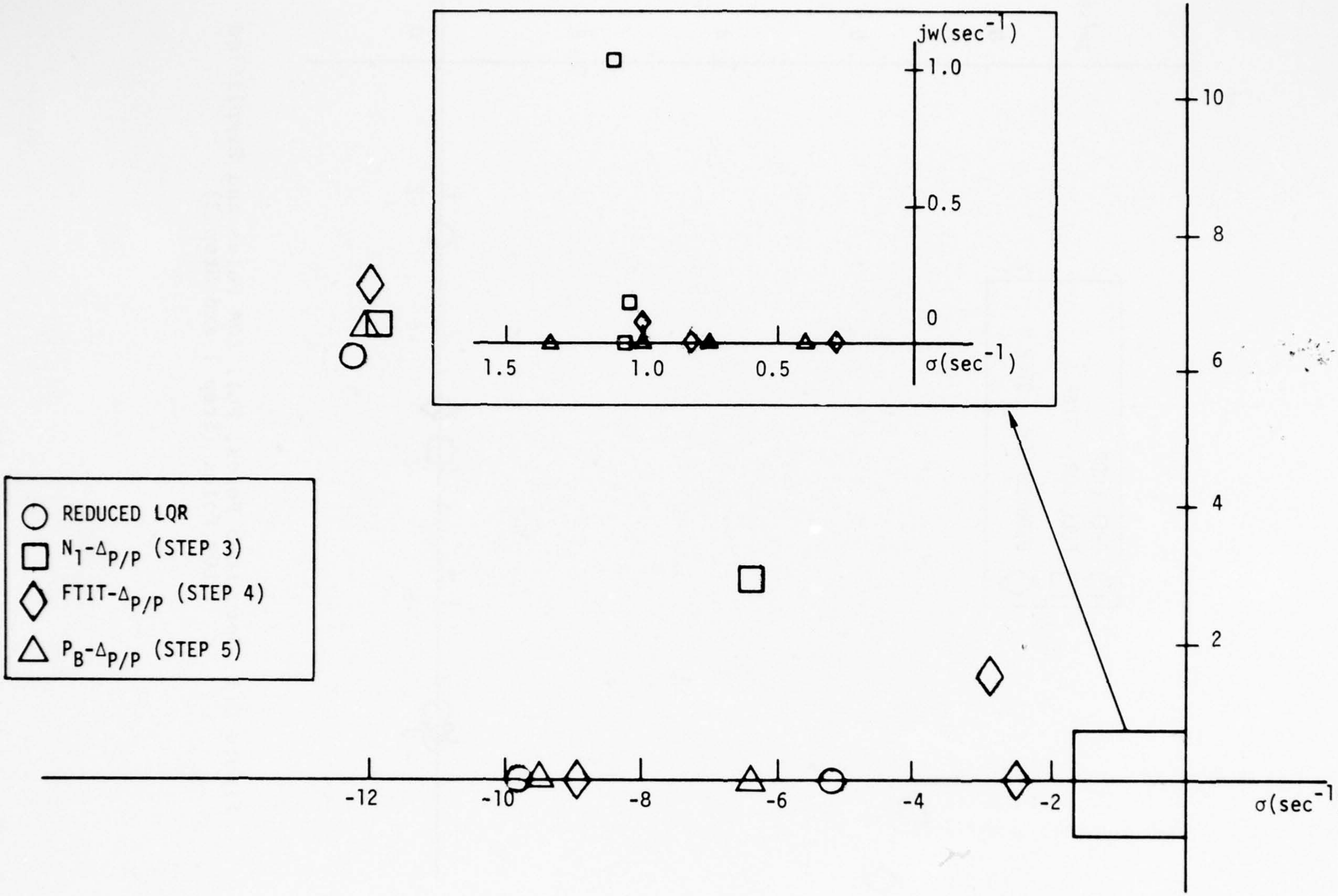


Figure G.2 Effect of Integral Control on Simplified LQR Roots - Steps 3, 4, and 5

STEP 1

DESIGN MODEL AND WEIGHTS FOR TRANSIENT CONTROL

+---------------+
+ INPUT DATA +
+---------------+

NUMBER OF STATES = 5
NUMBER OF CONTROLS = 5
NUMBER OF OUTPUTS = 7
NUMBER OF PROCESS NOISE SOURCES = 1
NUMBER OF OBSERVATIONS = 1

NUMBER OF SENSITIVITY PARAMETERS = 0

A

	1	2	3	4	5
1	4.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	4.0000-004	0.0000	0.0000	0.0000
3	0.0000	0.0000	1.0000-001	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000

B

	1	2	3	4	5
1	1.0000-004	0.0000	0.0000	0.0000	0.0000
2	0.0000	2.0000+001	0.0000	0.0000	0.0000
3	0.0000	0.0000	2.5000-001	0.0000	0.0000
4	0.0000	0.0000	0.0000	1.0000-001	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0000+005

	1	2	3	4	5
1	-3.2450+000	-2.1580+000	-9.1550+002	5.7310-001	1.3420+002
2	1.6420+000	-5.9410+000	-2.8160+002	1.8970-001	5.7050+001
3	1.6860-002	-2.5540-002	-1.0030+001	7.9940-003	5.8070-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-2.1630+000	6.8620+000	7.4050+002	1.1950+000	-1.7150+002

G

	1	2	3	4	5
1	1.4320-002	-3.5530+002	-9.9060+001	-1.5490+001	2.2200+004
2	2.8710-001	7.2860+002	2.5140+001	-6.4870+001	8.1220+003
3	-2.4690-003	-1.0300+002	6.3330-001	-3.2130-001	-7.4180+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-1.3110-001	3.2950+002	-2.5000+001	6.2570+001	-6.4450+004

HY

	1	2	3	4	5
1	1.6620+000	-1.7680+000	7.9990+001	-1.8900-001	3.7710+001
2	1.3830-002	3.1420-006	-1.0600-002	1.2890-004	-1.8390-007
3	1.6940-001	-1.1290-001	-4.9590+000	7.3860-002	-1.8350-001
4	7.5900-005	3.2690-006	-1.4770-002	2.2840-006	4.3150-005
5	-4.8590-005	1.3810-004	1.1400-002	1.9510-005	-2.6880-003
6	5.1770-005	-3.9090-005	-1.2300-002	-1.2280-005	2.0790-004
7	1.5700-005	2.2070-006	-3.2350-003	-2.6460-006	9.9150-006

OPTIMAL CLOSED LOOP EIGENSYSTEM

CLOSED-LOOP POLES FOR
STEP 1

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.74618+002)+J(0.00000)	0.00000	1.00000	1	(-8.06246-001)+J(0.00000)	-.8062462	.00000
			2	(-3.36304-001)+J(0.00000)	-.3363044	.00000
			3	(-3.47389-003)+J(0.00000)	-.0034739	.00000
			4	(-1.59454-004)+J(0.00000)	-.0001595	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.16961+001)+J(6.93704+000)	1.35986+001	.86010	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-5.66051-002)+J(9.26456-002)	.1085695	121.42433
			3	(1.39971-002)+J(-2.40777-002)	.0278506	-59.82927
			4	(-1.03011-001)+J(1.52724-001)	.1842167	123.99938
			5	(3.55219-002)+J(-1.14011-001)	.1194166	-72.69475
(-5.90184+000)+J(0.00000)	0.00000	1.00000	1	(-3.80943-001)+J(0.00000)	-.3809432	.00000
			2	(1.00000+000)+J(0.00000)	1.0000000	.00000
			3	(1.31485-002)+J(0.00000)	.0131485	.00000
			4	(-3.74230-001)+J(0.00000)	-.3742304	.00000
			5	(1.09910-001)+J(0.00000)	.1099100	.00000
(-9.86470+000)+J(0.00000)	0.00000	1.00000	1	(4.41643-002)+J(0.00000)	.0441643	.00000
			2	(-1.36439-001)+J(0.00000)	-.1364389	.00000
			3	(3.74593-003)+J(0.00000)	.0037459	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(-1.78089-002)+J(0.00000)	.0178089	.00000

~~THE RICCATI MATRIX~~

STATE FEEDBACK INFORMATION
FOR STEP 1

	1	2	3	4	5
1	2.6133-005	3.4553-006	-4.2355-004	1.5270-006	1.8951-005
2	3.4553-006	3.9572-005	-9.3247-005	1.5319-006	1.5015-005
3	-4.2355-004	-9.3247-005	1.5638-002	-3.5242-005	-3.1356-004
4	1.5270-006	1.5319-006	-3.5242-005	2.1425-007	1.6125-006
5	1.8951-005	1.5015-005	-3.1350-004	1.6125-006	1.8422-005

CONTROLLER FEEDBACK GAINS

	1	2	3	4	5
1	-1.5198-001	-2.4991-001	3.8270+000	-2.4798-002	-1.9066-001
2	-2.1551-003	-2.1078-003	8.1574-002	-2.3674-004	-2.1287-003
3	1.2976-002	-8.7253-004	-2.2942-001	7.0154-004	8.6358-003
4	-6.9291-003	1.6511-002	1.2634-001	1.0811-004	1.4170-004
5	5.8176-006	5.6270-006	-8.8886-005	5.4967-007	6.2138-006

F

	1	2	3	4	5
1	-3.2450+000	-2.1580+000	-9.1550+002	5.7310-001	1.3420+002
2	1.6420+000	-5.9410+000	-2.8160+002	1.8970-001	5.7050+001
3	1.6860-002	-2.5540-002	-1.0030+001	7.9940-003	5.8070-001
4	0.0000	0.0000	0.0000	-1.0000+001	0.0000
5	-2.1630+000	6.8620+000	7.4050+002	1.1950+000	-1.7150+002

G

	1	2	3	4	5
1	1.4320-002	-3.5530+002	-9.9060+001	-1.5490+001	2.2200+004
2	2.8710-001	7.2860+002	2.5140+001	-6.4870+001	8.1220+003
3	-2.4690-003	-1.0300+002	6.3330-001	-3.2130-001	-7.4180+001
4	1.0000+001	0.0000	0.0000	0.0000	0.0000
5	-1.3110-001	3.2950+002	-2.5000+001	6.2570+001	-6.4450+004

CLOSED LOOP EIGENSYSTEM FOR GIVEN C

CLOSED-LOOP POLE SHIFT AFTER GAIN MATRIX SIMPLIFICATION - STEP 2

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.72626+002)+J(0.00000)	0.00000	1.00000	1	(-8.08747-001)+J(0.00000)	-.8087474	.00000
			2	(-3.46453-001)+J(0.00000)	-.3464532	.00000
			3	(-2.04250-003)+J(0.00000)	-.0020425	.00000
			4	(-6.78425-004)+J(0.00000)	-.0006784	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
(-1.21896+001)+J(6.71599+000)	1.39173+001	.87586	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-7.13601-002)+J(9.49699-002)	.1187920	126.92107
			3	(1.57867-002)+J(-2.36603-002)	.0284434	-56.28781
			4	(-9.50639-002)+J(1.49643-001)	.1772856	122.42662
			5	(4.36604-002)+J(-1.12219-001)	.1204131	-68.74076
(-5.84776+000)+J(0.00000)	0.00000	1.00000	1	(-3.31401-001)+J(0.00000)	-.3314009	.00000
			2	(1.00000+000)+J(0.00000)	1.0000000	.00000
			3	(1.27132-002)+J(0.00000)	.0127132	.00000
			4	(-3.86951-001)+J(0.00000)	-.3869510	.00000
			5	(1.06270-001)+J(0.00000)	.1062697	.00000
(-9.99991+000)+J(0.00000)	0.00000	1.00000	1	(2.56486-001)+J(0.00000)	.2564856	.00000
			2	(-1.81813-001)+J(0.00000)	-.1818128	.00000
			3	(5.87368-003)+J(0.00000)	.0058737	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(2.16772-002)+J(0.00000)	.0216772	.00000

AUGMENTED CLOSED-LOOP POLE
VALIDATION - N_1- P MODE - STEP 3

+ CLOSED LOOP EIGENSYSTEM FOR GIVEN C +

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.72611+002)+J(0.00000)	0.00000	1.00000	1	(-8.08863-001)+J(0.00000)	-.8088631	.00000
			2	(-3.46337-001)+J(0.00000)	-.3463372	.00000
			3	(-2.04574-003)+J(0.00000)	-.0020457	.00000
			4	(4.49323-003)+J(0.00000)	.0044932	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(5.81781-005)+J(0.00000)	.0000582	.00000
			7	(2.09712-006)+J(0.00000)	.0000021	.00000
			8	(2.56798-009)+J(0.00000)	.0000000	.00000
			9	(-9.46864-009)+J(0.00000)	-.0000000	.00000
			10	(4.66605-003)+J(0.00000)	.0046861	.00000
(-1.25648+001)+J(5.52150+000)	1.37244+001	.91550	1	(-5.59368-002)+J(4.91165-001)	.4943402	96.49719
			2	(-9.91222-002)+J(-6.38267-002)	.1298157	-139.77910
			3	(1.42822-002)+J(8.98180-003)	.0166717	32.16501
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(7.55490-002)+J(2.46217-002)	.0794599	18.05096
			6	(4.19165-004)+J(-1.20066-004)	.0004360	-15.98380
			7	(-1.57692-004)+J(2.45212-004)	.0002915	122.74444
			8	(1.14486-007)+J(-1.64859-007)	.0000002	-55.22206
			9	(2.79654-006)+J(2.75991-006)	.0000039	44.62230
			10	(1.81291-002)+J(-3.11240-002)	.0360189	-59.78006

A3/0/0K AUGMENTED LINEAR MODEL DESIGN II

SYSTEMS CONTROL,INC.(VT) -
TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-6.45945+000)+J(3.48016+000)	7.33730+000	.88036	1	(1.97405-001)+J(5.07939-002)	.2038349	14.42966
			2	(-2.87211-002)+J(-1.61668-001)	.1641998	-100.07374
			3	(5.17292-003)+J(-5.22956-003)	.0073558	-45.31198
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(2.44232-002)+J(-3.34755-002)	.0414379	-53.88603
			6	(4.65442-005)+J(-3.08198-004)	.0003117	-81.41207
			7	(-1.44255-004)+J(5.76722-004)	.0005945	104.04317
			8	(-2.16556-007)+J(1.25604-008)	.0000002	176.68053
			9	(3.09264-006)+J(-1.23845-006)	.0000033	-21.82360
			10	(-2.04019-002)+J(-1.88554-002)	.0277806	-137.25587
(-1.13292+000)+J(1.10268+000)	1.58095+000	.71660	1	(5.75698-002)+J(-5.48412-002)	.0795100	-43.60951
			2	(9.82322-002)+J(-1.15644-001)	.1517335	-49.65417
			3	(4.56199-003)+J(4.08697-004)	.0045803	5.11932
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(2.93912-002)+J(-2.14103-003)	.0294691	-4.16640
			6	(-1.55216-003)+J(1.38413-003)	.0020797	138.27530
			7	(-1.51409-003)+J(-1.42449-003)	.0020789	-136.74637
			8	(-9.94089-007)+J(-8.50808-007)	.0000013	-139.44089
			9	(4.74838-006)+J(8.89679-006)	.0000101	61.91032
			10	(-5.02896-002)+J(-5.40361-004)	.0502925	-179.38438
(-1.06051+000)+J(1.29624-001)	1.06840+000	.99261	1	(5.52843-002)+J(-1.15695-002)	.0564819	-11.81984
			2	(6.63134-002)+J(-1.11589-001)	.1298056	-59.27840
			3	(2.09852-003)+J(1.19283-003)	.0024138	29.61449
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.84244-002)+J(5.45759-004)	.0184325	1.69669
			6	(-8.55617-003)+J(5.23232-003)	.0100292	148.55310
			7	(-1.31052-002)+J(-1.32231-003)	.0131717	-174.23835
			8	(-6.77512-006)+J(-3.08045-006)	.0000074	-155.55008
			9	(-5.37255-007)+J(8.53373-006)	.0000086	93.60240
			10	(-5.26765-002)+J(4.47081-003)	.0528659	175.14876

```
(-1.01485+000)+J( 0.00000    )  0.00000      1.00000   1  ( 5.30551-002)+J( 0.00000    )   .0530551     .00000
                                                       2  ( 2.30989-002)+J( 0.00000    )   .0230989     .00000
                                                       3  ( 9.27558-004)+J( 0.00000    )   .0009276     .00000
                                                       4  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                       5  ( 1.57759-003)+J( 0.00000    )   .0015776     .00000
                                                       6  (-3.40633-003)+J( 0.00000    )  -.0034063     .00000
                                                       7  (-8.44369-003)+J( 0.00000    )  -.0084437     .00000
                                                       8  (-3.01978-005)+J( 0.00000    )  -.0000302     .00000
                                                       9  (-2.74101-007)+J( 0.00000    )  -.0000003     .00000
                                                      10  (-5.22788-002)+J( 0.00000    )  -.0522788     .00000
```

AUGMENTED CLOSED-LOOP POLE
VALIDATION - FTIT-ΔP/P MODE - STEP 4

CLOSED LOOP EIGENSYSTEM FOR GIVEN C

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.72786+002)+J(0.00000)	0.00000	1.00000	1	(-8.08548-001)+J(0.00000)	-.8085479	.00000
			2	(-3.46337-001)+J(0.00000)	-.3463371	.00000
			3	(-2.10616-003)+J(0.00000)	-.0021062	.00000
			4	(-2.32999-002)+J(0.00000)	-.0232999	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(5.82512-005)+J(0.00000)	.0000583	.00000
			7	(2.15000-006)+J(0.00000)	.0000022	.00000
			8	(2.55468-009)+J(0.00000)	.0000000	.00000
			9	(-1.27886-008)+J(0.00000)	-.0000000	.00000
			10	(-5.78751-003)+J(0.00000)	-.0057875	.00000
(-1.23100+001)+J(7.54715+000)	1.44394+001	.85253	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-1.78099-002)+J(1.60857-001)	.1618400	96.31800
			3	(1.19411-002)+J(-2.77803-002)	.0302380	-66.74007
			4	(-8.38698-001)+J(-1.61758-001)	.8541542	-169.08353
			5	(1.88890-002)+J(-1.30226-001)	.1315883	-81.74688
			6	(-3.10509-004)+J(-8.21365-004)	.0008781	-110.70858
			7	(3.25920-004)+J(2.78248-004)	.0004285	40.48847
			8	(-3.53030-007)+J(-2.44060-007)	.0000004	-145.34279
			9	(4.30624-006)+J(-4.69570-006)	.0000064	-47.47734
			10	(-5.82915-003)+J(7.00502-003)	.0091131	129.76514

83/0/0K AUGMENTED LINEAR MODEL DESIGN III

SYSTEMS CONTROL, INC. (VT) - TIME DOMAIN SYNTHESIS AND ANALYSIS PROGRAM

(-9.00205+000)+J(0.00000)	0.00000	1.00000	1	(2.17168-001)+J(0.00000)	.2171676	.00000
			2	(-2.14366-001)+J(0.00000)	-.2143663	.00000
			3	(4.00274-003)+J(0.00000)	.0040027	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.16753-002)+J(0.00000)	.0116753	.00000
			6	(-2.16735-004)+J(0.00000)	-.0002167	.00000
			7	(5.70165-004)+J(0.00000)	.0005702	.00000
			8	(-1.62077-008)+J(0.00000)	-.0000000	.00000
			9	(1.22352-006)+J(0.00000)	.0000012	.00000
			10	(-1.29696-003)+J(0.00000)	-.0012970	.00000
(-3.27786+000)+J(1.81275+000)	3.74572+000	.87509	1	(1.45114-002)+J(1.17910-003)	.0145592	4.64526
			2	(7.57300-002)+J(-1.03797-001)	.1284869	-53.88567
			3	(6.37420-003)+J(-1.37022-003)	.0065198	-12.13184
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(3.80331-002)+J(-1.13817-002)	.0396996	-16.66027
			6	(5.56836-004)+J(4.16239-004)	.0006952	36.77842
			7	(-9.16838-004)+J(9.71271-005)	.0009240	173.96587
			8	(-3.39343-007)+J(1.43939-008)	.0000003	177.57114
			9	(6.13825-006)+J(2.19987-006)	.0000065	19.71698
			10	(-1.03560-002)+J(-2.25487-003)	.0105987	-167.71641
(-2.48649-001)+J(0.00000)	0.00000	1.00000	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(5.49279-001)+J(0.00000)	.5492785	.00000
			3	(-2.45037-003)+J(0.00000)	-.0024504	.00000
			4	(8.18525-001)+J(0.00000)	.8185252	.00000
			5	(6.45945-003)+J(0.00000)	.0064595	.00000
			6	(3.05817-002)+J(0.00000)	.0305817	.00000
			7	(2.45562-003)+J(0.00000)	.0024558	.00000
			8	(1.19099-005)+J(0.00000)	.0000119	.00000
			9	(-7.73748-005)+J(0.00000)	-.0000774	.00000
			10	(-2.59782-002)+J(0.00000)	-.0259782	.00000

(-8.26560-001)+J(0.00000)	0.00000	1.00000	1	(2.65166-001)+J(0.00000)	.2651665	.00000
			2	(-5.11213-001)+J(0.00000)	-.5112134	.00000
			3	(2.71872-003)+J(0.00000)	.0027187	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(9.94159-003)+J(0.00000)	.0099416	.00000
			6	(7.96286-003)+J(0.00000)	.0079629	.00000
			7	(-5.73734-002)+J(0.00000)	-.0573734	.00000
			8	(-7.33510-006)+J(0.00000)	-.0000073	.00000
			9	(1.17698-005)+J(0.00000)	.0000118	.00000
			10	(-1.20277-002)+J(0.00000)	-.0120277	.00000
(-1.01106+000)+J(1.70928-002)	1.01120+000	.99986	1	(-1.04750-004)+J(4.87949-004)	.0004991	102.11608
			2	(2.98314-003)+J(-2.11012-002)	.0213110	-81.95326
			3	(1.39802-003)+J(1.69724-004)	.0014083	6.92201
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.50410-002)+J(-4.85578-004)	.0150489	-1.84907
			6	(-1.16108-002)+J(1.18285-003)	.0118699	174.28094
			7	(-1.94902-002)+J(-1.61138-004)	.0194908	-179.52631
			8	(-7.83018-006)+J(-1.34995-006)	.0000079	-170.21818
			~~9~~	~~(-3.54463-006)+J(1.49467-006)~~	.0000038	157.13622
			10	(-1.48804-002)+J(2.28702-004)	.0148822	179.11947

AUGMENTED CLOSED-LOOP POLE VALIDATION - P_B - $\Delta p/p$ MODE - STEP 5

CLOSED LOOP EIGENSYSTEM FOR GIVEN C

EIGENVALUE	NATURAL FREQUENCY	DAMPING FACTOR		EIGENVECTOR	MAGNITUDE	PHASE (DEG)
(-1.72625+002)+J(0.00000)	0.00000	1.00000	1	(-8.08776-001)+J(0.00000)	-.8087756	.00000
			2	(-3.46468-001)+J(0.00000)	-.3464678	.00000
			3	(-2.04081-003)+J(0.00000)	-.0020408	.00000
			4	(-1.14958-003)+J(0.00000)	-.0011496	.00000
			5	(1.00000+000)+J(0.00000)	1.0000000	.00000
			6	(5.84124-005)+J(0.00000)	.0000584	.00000
			7	(2.10959-006)+J(0.00000)	.0000021	.00000
			8	(2.56909-009)+J(0.00000)	.0000000	.00000
			9	(-1.00485-008)+J(0.00000)	-.0000000	.00000
			10	(-1.68607-004)+J(0.00000)	-.0001686	.00000
(-2.09283+001)+J(0.00000)	0.00000	1.00000	1	(-1.30467-001)+J(0.00000)	-.1304667	.00000
			2	(-1.72389-002)+J(0.00000)	-.0172389	.00000
			3	(-4.63538-004)+J(0.00000)	-.0004635	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(8.75021-003)+J(0.00000)	.0087502	.00000
			6	(8.12274-005)+J(0.00000)	.0000812	.00000
			7	(-2.82815-005)+J(0.00000)	-.0000283	.00000
			8	(4.02259-008)+J(0.00000)	.0000000	.00000
			9	(2.63673-007)+J(0.00000)	.0000003	.00000
			10	(2.38631-002)+J(0.00000)	.0238631	.00000

(-1.20286+001)+J(6.80263+000)	1.38190+001	.87044	1	(1.00000+000)+J(0.00000)	1.0000000	.00000
			2	(-6.44531-002)+J(1.26894-001)	.1423242	116.92739
			3	(1.41561-002)+J(-2.67886-002)	.0302989	-62.14643
			4	(-2.10800-001)+J(-3.25191-001)	.3875382	-122.95269
			5	(3.33361-002)+J(-1.29050-001)	.1332865	-75.51607
			6	(-3.28964-004)+J(-8.11205-004)	.0008754	-112.07380
			7	(3.67402-004)+J(3.28957-004)	.0004932	41.84003
			8	(-3.75461-007)+J(-2.23623-007)	.0000004	-149.22211
			9	(4.76792-006)+J(-4.61357-006)	.0000066	-44.05740
			10	(-6.86859-003)+J(-1.22501-003)	.0069770	-169.88763
(-9.46628+000)+J(0.00000)	0.00000	1.00000	1	(2.19512-001)+J(0.00000)	.2195118	.00000
			2	(-1.93992-001)+J(0.00000)	-.1939922	.00000
			3	(4.74705-003)+J(0.00000)	.0047471	.00000
			4	(1.00000+000)+J(0.00000)	1.0000000	.00000
			5	(1.61966-002)+J(0.00000)	.0161966	.00000
			6	(-1.87359-004)+J(0.00000)	-.0001874	.00000
			7	(4.90507-004)+J(0.00000)	.0004905	.00000
			8	(-3.37896-008)+J(0.00000)	-.0000000	.00000
			9	(1.41825-006)+J(0.00000)	.0000014	.00000
			10	(-8.35491-004)+J(0.00000)	-.0008355	.00000
(-6.20636+000)+J(0.00000)	0.00000	1.00000	1	(-4.67134-001)+J(0.00000)	-.4671343	.00000
			2	(1.00000+000)+J(0.00000)	1.0000000	.00000
			3	(1.60337-002)+J(0.00000)	.0160337	.00000
			4	(-1.26203-001)+J(0.00000)	-.1262035	.00000
			5	(1.27887-001)+J(0.00000)	.1278873	.00000
			6	(2.11600-003)+J(0.00000)	.0021160	.00000
			7	(-4.16364-003)+J(0.00000)	-.0041636	.00000
			8	(-7.11455-007)+J(0.00000)	-.0000007	.00000
			9	(1.04659-005)+J(0.00000)	.0000105	.00000
			10	(-4.09400-004)+J(0.00000)	-.0004094	.00000

```
(-3.68689-001)+J( 0.00000   )  0.00000     1.00000   1  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                     2  ( 3.87287-001)+J( 0.00000   )   .3872870    .00000
                                                     3  (-4.72102-003)+J( 0.00000   )  -.0047210    .00000
                                                     4  ( 7.49082-002)+J( 0.00000   )   .0749082    .00000
                                                     5  (-1.25165-002)+J( 0.00000   )  -.0125165    .00000
                                                     6  (-3.47359-002)+J( 0.00000   )  -.0347359    .00000
                                                     7  (-1.74672-003)+J( 0.00000   )  -.0017467    .00000
                                                     8  ( 1.25439-005)+J( 0.00000   )   .0000125    .00000
                                                     9  (-6.45110-005)+J( 0.00000   )  -.0000645    .00000
                                                    10  (-1.71461-002)+J( 0.00000   )  -.0171461    .00000

(-7.60030-001)+J( 0.00000   )  0.00000     1.00000   1  (-8.06004-001)+J( 0.00000   )  -.8060038    .00000
                                                     2  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                     3  ( 1.29820-003)+J( 0.00000   )   .0012982    .00000
                                                     4  (-7.72137-002)+J( 0.00000   )  -.0772137    .00000
                                                     5  ( 2.64978-002)+J( 0.00000   )   .0264978    .00000
                                                     6  (-4.19396-002)+J( 0.00000   )  -.0419396    .00000
                                                     7  ( 9.27290-002)+J( 0.00000   )   .0927290    .00000
                                                     8  ( 4.59506-006)+J( 0.00000   )   .0000046    .00000
                                                     9  (-5.67254-006)+J( 0.00000   )  -.0000057    .00000
                                                    10  (-2.04336-003)+J( 0.00000   )  -.0020434    .00000

(-1.36306+000)+J( 0.00000   )  0.00000     1.00000   1  ( 3.42753-001)+J( 0.00000   )   .3427528    .00000
                                                     2  ( 1.00000+000)+J( 0.00000   )  1.0000000    .00000
                                                     3  (-2.56769-002)+J( 0.00000   )  -.0256769    .00000
                                                     4  ( 1.01292-001)+J( 0.00000   )   .1012922    .00000
                                                     5  (-8.00102-002)+J( 0.00000   )  -.0800102    .00000
                                                     6  (-6.87595-002)+J( 0.00000   )  -.0687595    .00000
                                                     7  (-3.04246-002)+J( 0.00000   )  -.0304246    .00000
                                                     8  (-1.96214-005)+J( 0.00000   )  -.0000196    .00000
                                                     9  (-1.19884-004)+J( 0.00000   )  -.0001199    .00000
                                                    10  (-2.84951-002)+J( 0.00000   )  -.0284951    .00000
```

```
(-2.91243-001)+J( 0.00000    )  0.00000        1.00000   1  ( 1.00000+000)+J( 0.00000    )  1.0000000     .00000
                                                         2  (-1.57995-001)+J( 0.00000    )  -.1579952     .00000
                                                         3  ( 4.93637-002)+J( 0.00000    )   .0493637     .00000
                                                         4  ( 7.34081-002)+J( 0.00000    )   .0734081     .00000
                                                         5  ( 7.21565-001)+J( 0.00000    )   .7215648     .00000
                                                         6  (-1.98719-001)+J( 0.00000    )  -.1987189     .00000
                                                         7  (-4.11712-001)+J( 0.00000    )  -.4117118     .00000
                                                         8  ( 1.07725-003)+J( 0.00000    )   .0010772     .00000
                                                         9  ( 2.77623-005)+J( 0.00000    )   .0000278     .00000
                                                        10  ( 1.36732-003)+J( 0.00000    )   .0013673     .00000
```

*FIN

APPENDIX H

TRANSITION CONTROL DATA

The development of the transition control is discussed in detail in Section 4.5 (Volume I). The fifth order design models were used to calculate the numerical quantities used for the transition control design. This data is presented in this section. A critical step in the design is the partition of the dynamical state equations to determine the primary set, δx_1 and the secondary set δx_2. Since the RCVV's, CIVV's, and bleeds have only a small range of motion, these controls were not used during large accelerations in the explicit transition algorithm. Fuel flow and jet area were the two controls used for the acceleration control The fuel flow is the primary acceleration regulating variable. Jet area has a strong effect on engine response, even though its excursions are limited, essentially, to increases about the steady-state values. Thus, the physical character of the F100 behavior was the determining factor in the choice of modulated controls.

The primary state rates chosen were the fan speed and compressor speed. These were used because the continuous state asymptotic expansion will provide continuous reference trajectories for these values which is close to being phsyically realizable. Also, the effects of the two controls on the speeds were independent as required by an invertible G_1 matrix. This fact is directly calculated from the equation, or physically justified by realizing that fuel affects the rotor speeds collectively while nozzle area affects the speed differentially.

The definitions of the partitions of the fifth order design models are given in Table H.1. The specific values

Table H.1
Variable Index

$$\begin{bmatrix} \delta\dot{x}_1 \\ \hdashline \delta\dot{x}_2 \end{bmatrix} = \underbrace{\begin{bmatrix} F_{11} & \vdots & F_{12} \\ \hdashline F_{21} & \vdots & F_{22} \end{bmatrix}}_{F} \begin{bmatrix} \delta x_1 \\ \hdashline \delta x_2 \end{bmatrix} + \underbrace{\begin{bmatrix} G_1 \\ \hdashline G_2 \end{bmatrix}}_{G} \delta u$$

$$\delta y = \underbrace{[H_1 \vdots H_2]}_{HY} \begin{bmatrix} \delta x_1 \\ \delta x_2 \end{bmatrix} + \underbrace{D_1 \delta u}_{DY}$$

ELEMENT	UNITS	ELEMENT	UNITS
δx_1		δu	
Low Rotor Speed	RPM	Fuel Flow Command	lbm/hr
High Rotor Speed	RPM	Nozzle Area	ft^2
δx_2		δy	
Augmentor Pressure	psia	Thrust	lbf
Fuel Flow	lbm/hr	Airflow	lbm/sec
Burner Pressure	psia	Turbine Temperature	°R
		Fan Stability Margin	---
		Compressor Stability Margin	---
		$\Delta p/p^*$	---
		$(\Delta p/p)^*_{avg}$	---

*Not included in some models

used in the design of the rate schedules are discussed in Section 5.9.2 and listed in Table 5.9 (Volume I). The formulas for the design of the rates are derived in Section 4.5 and the formulas for data provided in the printout are shown in Table H.2.

The data is presented for the equations specified in Table H.2 for the conditions used to derive the transient rates for the controller presented in Table 5.9. Eleven cases are presented as reference data and these cases are indexed in Table H.3.

A diagram of the rate limited structure of the transition model is shown in Figure H.1. For various size inputs, the normalized output is shown in Figure H.2. It is obvious that for small inputs, the response is determined by the regulator/trim control. For large transients, the transition control has authority until the steady-state condition is approached. The structure used is always globally state and does not use switching or other undesirable high gain nonlinearities which can degrade overall stability.

Table H.2
Matrix Index

Intermediate Matrices:

$$\bar{F}_1 = F_{21} - G_2 G_1^{-1} F_{11}$$

$$\bar{F}_2 = F_{22} - G_2 G_1^{-1} F_{12}$$

State Rate Compatability Matrix:

$$M = \bar{F}_2^{-1} \bar{F}_1$$

State Initial Jump Matrix:*

$$\delta x_2(0) = \underline{-\bar{F}_2^{-1} [M + G_2 G_1^{-1}]}\ \alpha_1$$

Control Initial Jump Matrix:*

$$\delta u(0) = \underline{G_1^{-1} [I + F_{12} \bar{F}_2^{-1} (M + G_2 G_1^{-1})]}\ \alpha_1$$

Control Rate Matrix:*

$$r_u = \underline{-G_1^{-1} [F_{11} - F_{12} M]}\ \alpha_1$$

Output Jump Matrix:

$$P = -H_2 \bar{F}_2^{-1} [M + G_2 G_1^{-1}] + D G_1^{-1}$$

Output Rate Matrix:

$$Q = H_1 - D G_1^{-1} F_{11} + (H_2 + D G_1^{-1} F_{12}) M$$

*Matrix included in data is underlined

Table H.3
Index of Transition Data

CASE	POWER LEVER ANGLE (DEG)	ALTITUDE (FT)	MACH NO.	PAGE
1	83	0	0	429
2	67	0	0	433
3	52	0	0	438
4	36	0	0	443
5	24	0	0	448
6	20	0	0	453
7	83	0	1.2	458
8	83	30,000	0.9	463
9	20	30,000	0.9	468
10	83	45,000	0.9	472
11	40	45,000	0.9	476

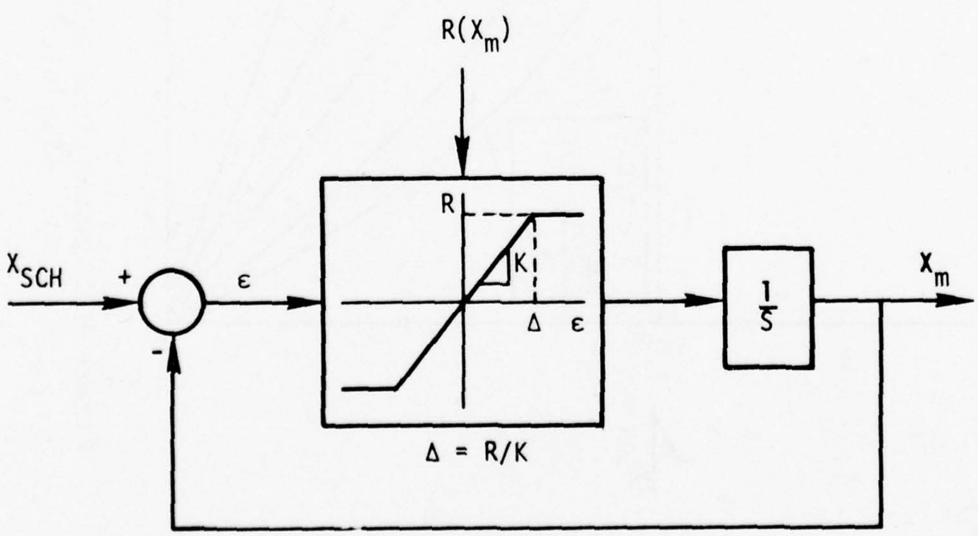


Figure H.1 Basic Structure of Transition Control Logic

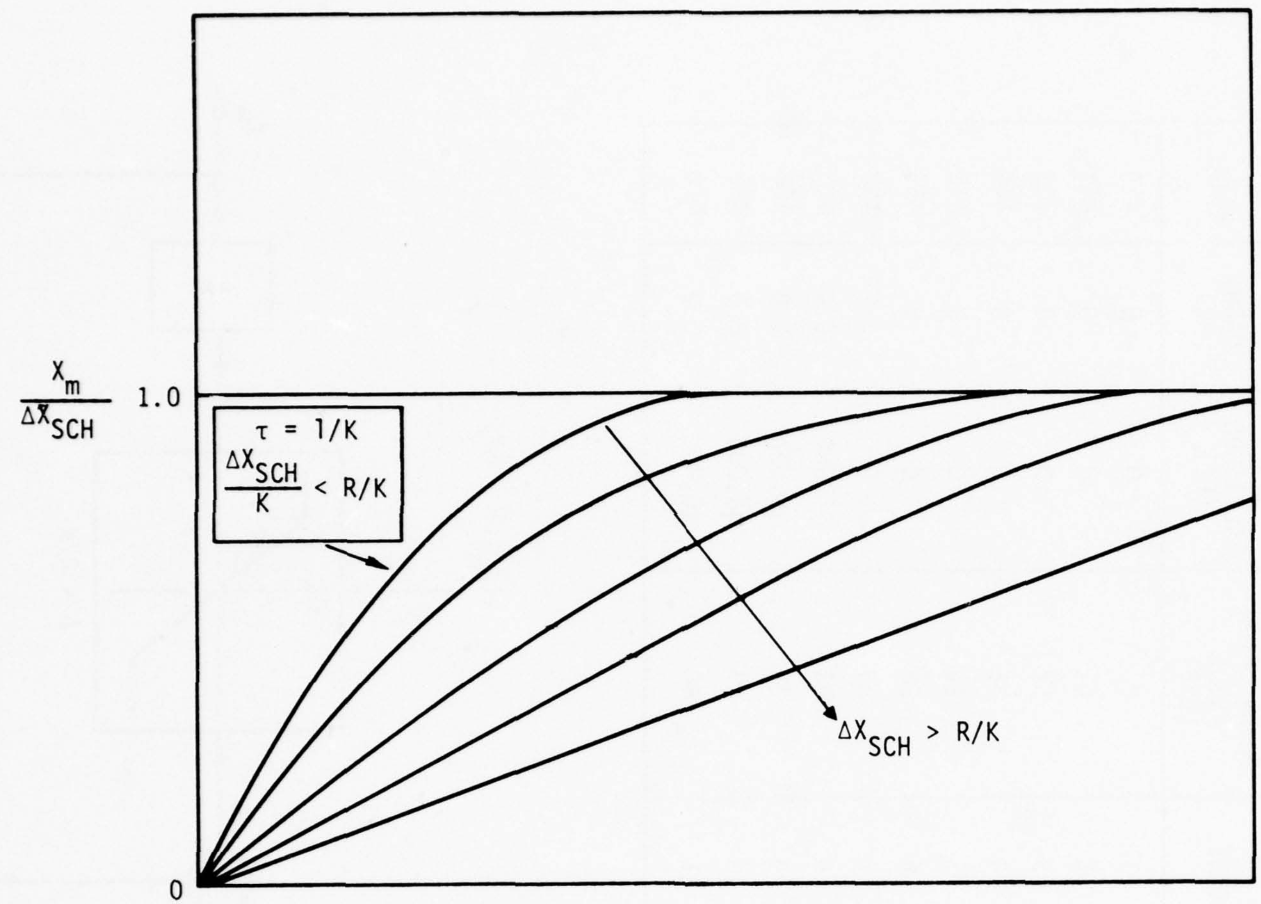


Figure H.2 Normalized Response of Transition Control to Steps in Scheduled Input X_{SCH} $(X_m(0) = 0)$

F		REDUCED MATRICES	0/0K 83	FIFTH ORDER
-.3245+01	-.2158+01	-.9155+03	.5731+00	.1342+03
.1642+01	-.5941+01	-.2816+03	.1897+00	.5705+02
.1666-01	-.2551-01	-.1003+02	.7994-02	.5807+00
.0000	.0000	.0000	-.1000+02	.0000
-.2163+01	.6852+01	.7405+03	.1195+01	-.1715+03

G		REDUCED MATRICES	0/0K 83	FIFTH ORDER
.1432-01	-.3553+03	-.9906+02	-.1549+02	.2220+05
.2971+00	.7266+03	.2514+02	-.6467+02	.8122+04
-.2669-02	-.1039+03	.6333+00	-.3213+00	-.7418+02
.1000+02	.0000	.0000	.0000	.0000
-.1311+00	.3295+03	-.2500+02	.6257+02	-.6445+05

HY		REDUCED MATRICES	0/0K 83	FIFTH ORDER
.1662+01	-.1759+01	.7999+02	-.1890+00	.3771+02
.1383-01	.3142-05	-.1060-01	.1282-03	-.1839-06
.1694+00	-.1129+00	-.4959+01	.7386-01	-.1535+00
.7590-04	.3262-05	-.1477-01	.2284-05	.4315-04
-.4859-04	.1341-05	.1140-01	.1951-04	-.2688-02
.5177-04	-.5909-04	-.1230-01	-.1228-04	.2079-03
.1570-04	.2207-05	-.3295-02	-.2606-05	.9915-05

DY		REDUCED MATRICES	0/0K 83	FIFTH ORDER
.1362+00	.1992+03	.4802+02	-.1503+02	.1063+05
.1049-05	.3335+00	.4806+00	.2812-03	.3264-03
.2967-01	.7927+02	.2567+01	-.7631+00	.2066+04
.1046-05	-.7720-02	-.5814-02	.1157-03	.6665-01
-.5305-05	-.7897-02	-.6841-03	-.9643-03	-.2815+00
.5727-05	.5588-02	.1833-02	-.2902-03	.1884+00
.1264-05	.2364-02	.6881-03	.4668-04	.4065-01

F11

	1	2
1	-3.2450+000	-2.1580+000
2	1.6420+000	-5.9410+000

F12

	1	2	3
1	-9.1550+002	5.7310-001	1.3420+002
2	-2.8160+002	1.8970-001	5.7050+001

F21

	1	2
1	1.6860-002	-2.5540-002
2	0.0000	0.0000
3	-2.1630+000	6.8520+000

F22

	1	2	3
1	-1.0030+001	7.9940-003	5.8070-001
2	0.0000	-1.0000+001	0.0000
3	7.4050+002	1.1950+000	-1.7150+002

G1

	1	2
1	1.7370-002	-3.5530+002
2	2.6710-001	7.2560+002

G2

	1	2
1	-2.4690-003	-1.6300+002
2	1.0000+001	0.0000
3	-1.3110-001	3.2950+002

H1

	1	2
1	1.6620+000	-1.7680+000
2	1.3630-002	3.1420-006
3	1.5940-001	-1.1290-001
4	7.5900-005	3.2690-006
5	-4.3590-005	1.3610-004
6	5.1770-005	-3.9090-005
7	1.5700-005	2.2070-006

H2

	1	2	3
1	7.9990+001	-1.8900-001	3.7710+001
2	-1.0600-002	1.2590-004	-1.8390-007
3	-4.9590+000	7.3060-002	-1.8350-001
4	-1.4770-002	2.2240-006	4.3150-005
5	1.1400-002	1.9510-005	-2.6880-003
6	-1.2300-002	-1.2280-005	2.0790-004
7	-3.2950-003	-2.6460-006	9.9150-006

D1

	1	2
1	1.3020-001	1.0920+002
2	1.4390-007	3.5950-001
3	2.9670-002	7.9270+001
4	1.0460-006	-7.7200-003
5	-8.3950-006	-7.6970-003
6	5.7270-006	8.4580-003
7	1.2840-006	2.3640-003

CONSTANT VELOCITY CONTROLLER 83 0/0K 3/10/76

$\overline{F2}$

	1	2	3
1	2.1020+002	-1.2959-001	-3.1373+001
2	6.8222+004	-5.3131+001	-1.0494+004
3	-9.1231+002	2.2346+000	7.6651+001

$\overline{F1}$

	1	2
1	8.5272-001	3.8320-001
2	1.5239+002	3.2757+002
3	-7.0385+000	1.0013+000

STATE RATE COMP. MATRIX

	1	2
1	-3.6657-002	5.0386-002
2	-5.0370+000	9.4603+000
3	-1.9762-001	3.1072-001

STATE INITIAL JUMP MATRIX

	1	2
1	-7.0235-003	1.0025-002
2	-1.0429+000	2.5315+000
3	-3.3710-002	5.0458-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	5.4799+000	3.1599+000
2	-2.5534-003	1.2736-004

CONTROL RATE MATRIX

	1	2
1	-5.0370+000	9.4603+000
2	2.3489-003	-2.8950-003

OUTPUT RATE MATRIX

	1	2
1	-7.9584+000	1.2645+001
2	1.4366-002	-2.9255-004
3	5.2166-002	3.3057-001
4	5.7389-004	-6.7366-004
5	-9.9042-006	5.3503-006
6	5.1498-004	-6.8141-004
7	1.4698-004	-1.8053-004

CONSTANT VELOCITY CONTROLLER 83 0/0K 3/10/76

OUTPUT JUMP VECTOR

	1	2
1	-1.3009+000	2.8140+000
2	-9.2590-004	2.6371-004
3	-4.6159-002	2.3111-001
4	1.2639-004	-1.3765-004
5	-4.4933-005	-1.0210-005
6	1.6711-004	-1.2390-004
7	2.7801-005	-3.4839-005

67/OK/O

```
#XQT   ABS
 F                   REDUCED MATRICES   0/0K  67  FIFTH ORDER
-.4178+01 -.1415+01 -.8026+03  .5835+00  .1364+03
-.3057-01 -.5648+01 -.9944+02  .5930+00  .6073+02
 .2978-01 -.3524-01 -.4803+01 -.1095-01  .9307+00
 .0000     .0000     .0000    -.1000+02  .0000
 .3883+00  .6683+01  .2732+03  .2003+01 -.1718+03
 G                   REDUCED MATRICES   0/0K  67  FIFTH ORDER
-.1611+00  .5493+02 -.1223+03 -.1330+01  .2072+05
-.1625+00  .7967+03 -.1470+02 -.7235+02  .9983+04
-.3299-02 -.6043+02  .8846+00  .1458+00  .4412+03
 .1000+02  .8102-14  .3775-16 -.4418-16 -.1649-13
-.2975+00 -.8463+03  .3263+02  .3052+02 -.6094+05
 HY                  REDUCED MATRICES   0/0K  67  FIFTH ORDER
 .1010+01 -.1433+01  .1859+03  .1052+00  .3407+02
 .2580-01  .4177-03 -.1876+00  .5482-04 -.4457-04
 .3395-01 -.1017+00 -.2178+01  .1703+00 -.3455+00
 .1081-03  .3083-04 -.1382-01  .1079-05 -.4773-05
-.4987-04  .3707-03  .1642-02  .3941-04 -.3791-02
 DY                  REDUCED MATRICES   0/0K  67  FIFTH ORDER
-.1407+00  .1386+03  .3129+02 -.6397+01  .7577+04
-.4621-04 -.1647+01  .9497+00  .6715-03 -.6643+00
-.7142-02  .5123+02 -.5180+00  .4989+00  .1263+04
```

```
-.3422-05 -.2798-01 -.5638-02  .1323-03 -.2552-01
-.1718-04 -.4152-01  .2144-03 -.8392-02 -.4370+00
```

F11

	1	2
1	-4.1780+000	-1.4150+000
2	-3.0570-002	-5.6480+000

F12

	1	2	3
1	-8.0260+002	5.8350-001	1.3640+002
2	-9.9440+001	5.9300-001	6.0730+001

F21

	1	2
1	2.9780-002	-3.5240-002
2	0.0000	0.0000
3	3.8830-001	6.6830+000

F22

	1	2	3
1	-4.8030+000	-1.0950-002	9.3070-001
2	0.0000	-1.0000+001	0.0000
3	2.7320+002	2.0030+000	-1.7180+002

G1

	1	2
1	-1.6110-001	5.4930+001
2	-1.6250-001	7.9670+002

G2

	1	2
1	-3.2990-003	-6.0430+001
2	1.0000+001	8.1020-015
3	-2.9750-001	-8.4630+002

H1

	1	2
1	1.0100+000	-1.4330+000
2	2.5800-002	4.1770-004
3	3.3950-002	-1.0170-001
4	1.0810-004	3.0830-005
5	4.9870-005	3.7070-004

H2

	1	2	3
1	1.8590+002	1.0520-001	3.4070+001
2	-1.8760-001	5.4820-005	-4.4570-005
3	-2.1780+000	1.7030-001	-3.4550-001

4	-1.3820-002	1.0790-006	-4.7730-006
5	1.6420-003	3.9410-005	-3.7910-003

D1

	1	2
1	-1.4070-001	1.3860+002
2	-4.6210-005	-1.6470+000
3	-7.1420-003	5.1230+001
4	-3.4220-006	-2.7980-002
5	-1.7180-005	-4.1520-002

CONSTANT VELOCITY CONTROLLER 67 PLA FEB. 13,1976

F2

	1	2	3
1	7.0600+001	-2.2531-002	-8.2443+000
2	-5.3086+004	2.6199+001	8.8203+003
3	2.6632+003	9.3113-001	-5.2195+002

$\overline{F1}$

	1	2
1	4.6274-001	-3.5674-001
2	-2.7859+002	-6.8420+001
3	1.3453+001	-3.8999+000

STATE RATE COMP. MATRIX

	1	2
1	-9.5864-003	1.9692-002
2	-6.2504-001	3.8545+000
3	-2.4256-002	1.1483-001

STATE INITIAL JUMP MATRIX

	1	2
1	-2.4648-003	4.7275-003
2	-1.7262-001	1.4547+000
3	-6.8295-003	2.4048-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	-6.6713+000	4.5996-001
2	-1.3607-003	1.3490-003

CONTROL RATE MATRIX

	1	2
1	-6.2504-001	3.8545+000
2	1.0285-003	-1.2887-003

OUTPUT RATE MATRIX

	1	2
1	-1.4338+000	5.8245+000
2	2.5900-002	-1.1260-003
3	1.3922-002	3.7862-001
4	2.1339-004	-2.1484-004
5	-3.0257-005	1.0691-004

CONSTANT VELOCITY CONTROLLER 67 PLA FEB. 13,1976

OUTPUT JUMP VECTOR

	1	2
1	4.1002-002	1.9735+000
2	3.0026-003	-3.0513-003
3	-4.3732-002	2.0495-001
4	9.4812-005	-1.0320-004
5	1.8615-004	-8.9987-005

PROCESSED BY UNIVAC 1100 SERIES EXEC PROCESSOR LEVEL 48 AT 9:45:46 AM ON TUESDAY, FEBRUARY 17, 1976 (CREATING CYCLE 0)

```
         CONSTANT VELOCITY CONTROLLER   52   PLA       2/13/76
     $OPTION  NX=5, NY=5, NU=5, NIND=2, REORD=.TRUE.     $END
        1     2     5     3     4
    F                              REDUCED MATRICES   0/OK  52  FIFTH ORDER
     -.4256+01  -.1230+01  -.5354+03  -.3101+00   .1575+03
     -.1048+01  -.3382+01  -.3261+02   .7345+00   .5158+02
      .1418-01  -.2113-01  -.6141+01  -.2547-03   .6924+00
      .0000      .0000      .0000     -.1000+02   .0000
      .2091+01   .5079+01  -.9684+02   .3299+01  -.1780+03
    G                              REDUCED MATRICES   0/OK  52  FIFTH ORDER
     -.2134+00   .1368+04  -.9307+02   .3127+02   .3656+05
     -.3166+00   .7179+03  -.2481+02  -.3510+02   .8093+04
     -.9446-03  -.5519+02   .3213+00   .9251-03   .1351+03
      .1000+02   .0000      .0000      .0000      .0000
     -.4822+00  -.2391+04   .5389+02  -.2716+02  -.6576+05
    HY                             REDUCED MATRICES   0/OK  52  FIFTH ORDER
      .6121+00  -.9525+00   .2669+03  -.2250+00   .3358+02
      .3037-01   .2260-02  -.8275+00   .1511-02  -.1851-01
     -.3804-01  -.1129+00  -.4708+01   .2276+00  -.2849+00
      .1864-03   .5936-04  -.2176-01   .4426-04  -.4862-03
      .6493-05   .4400-03  -.3186-02   .7207-04  -.4474-02
    DY                             REDUCED MATRICES   0/OK  52  FIFTH ORDER
     -.3975-01   .4417+03   .1378+02   .6186+01   .9332+04
     -.4410-03  -.2594+01   .7371+00  -.1712-01  -.1358+02
     -.3118-02   .2186+02  -.1793+01   .2361+00   .6608+03
     -.1159-04  -.2834-01   .2874-03  -.4779-03  -.3744+00
     -.4349-04  -.6229-01   .1560-02  -.7764-02  -.3150+00
```

52/0K/0

F11

	1	2
1	-4.2560+000	-1.2300+000
2	-1.0480+000	-3.3820+000

F12

	1	2	3
1	-5.3540+002	-3.1010-001	1.5750+002
2	-3.2610+001	-7.3450-001	5.1580+001

F21

	1	2
1	1.4180-002	-2.1130-002
2	0.0000	0.0000
3	2.0910+000	5.0790+000

F22

	1	2	3
1	-6.1410+000	-2.5470+000	6.9240+001
2	0.0000	-1.0000+001	0.0000
3	-9.6840+001	3.2990+000	-1.7800+002

G1

	1	2
1	-2.1340-001	1.3680+003
2	-3.1660-001	7.1790+002

G2

	1	2
1	-9.4460-004	-5.5190+001
2	1.0000+001	0.0000
3	-4.8220-001	-2.3910+003

H1

	1	2
1	6.1210-001	-9.5250-001
2	3.0370-002	2.2600-003
3	-3.8040-002	-1.1290-001
4	1.8640-004	5.9360-005
5	6.4930-006	4.4000-004

H2

	1	2	3
1	2.4690+002	-2.2500-001	3.3580+001
2	-8.2750-001	1.5110-003	-1.8510-002
3	-4.7080+000	2.2760-001	-2.8490-00

4	-2.1760-002	4.4260-005	-4.8620-004
5	-3.1860-003	7.2070-005	-4.4740-003

D1

	1	2
1	-3.9750-002	4.4170+002
2	-4.4100-004	-2.5940+000
3	-3.1180-003	2.1860+001
4	-1.1590-005	-2.8340-002
5	-4.3490-005	-6.2290-002

$\overline{F2}$

	1	2	3
1	-3.9337+001	-5.4660-002	8.4974+000
2	1.2138+004	3.3851+001	-1.5186+003
3	-2.0706+003	-9.9302-001	2.2715+002

$\overline{F1}$

	1	2
1	-2.1288-001	5.7023-002
2	5.7937+001	-1.3374+002
3	-1.0302+001	1.4367+001

STATE RATE COMP. MATRIX

	1	2
1	-4.4695-003	1.3631-002
2	1.2192-001	2.2394+000
3	5.1451-003	7.0795-002

STATE INITIAL JUMP MATRIX

	1	2
1	-2.3416-003	3.6693-003
2	-1.1524-001	1.0988+000
3	-4.4758-003	2.0164-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	2.5648+000	-4.8873+000
2	1.1311-003	-7.6239-004

CONTROL RATE MATRIX

	1	2
1	1.2192-001	2.2394+000
2	8.1615-004	-1.0600-003

OUTPUT RATE MATRIX

	1	2
1	-7.9824-002	4.0017+000
2	3.1987-002	-5.1838-003
3	2.6746-002	2.8230-001
4	2.6201-004	-1.6846-004
5	-4.9640-005	2.0987-004

CONSTANT VELOCITY CONTROLLER 52 PLA 2/13/76

OUTPUT JUMP VECTOR

	1	2
1	-3.5169-001	1.2667+000
2	-2.2187-003	2.3837-003
3	2.7999-003	2.2565-001
4	-1.3752-005	3.7236-005
5	-1.6282-004	2.3733-004

```
PROCESSED BY UNIVAC 1100 SERIES FIT PROCESSOR LEVEL W8 AT 3:33:08 PM ON TUESDAY, FEBRUARY 17, 1976  (CREATING CYCLE 0)

         CONSTANT VELOCITY CONTROLLER   36   FLA        2/13/76
     $OPTION  NX=5, NY=5, NU=5, NIND=2, REORD=.TRUE.     $END
        1     2     5     3     4
   F                         REDUCED MATRICES   0/OK  36   FIFTH ORDER
     -.3981+01 -.1354+01 -.4566+03  .1817+00  .1447+03
     -.8148+00 -.2580+01 -.2302+03  .1612+01  .4189+02
      .1446-01 -.2900-01 -.5905+01 -.4870-02  .9448+00
      .0000     .0000     .0000    -.1000+02  .0000
      .1714+01  .5252+01  .1178+03  .2316+01 -.1685+03
   G                         REDUCED MATRICES   0/OK  36   FIFTH ORDER
     -.4634+00  .1134+04 -.5763+02  .1713+02  .2433+05
     -.3736+00 -.3427+03 -.1033+02 -.4991+02 -.3375+04
     -.8409-02 -.3481+02  .2523+00  .9561-01  .2430+03
      .1000+02  .0000     .0000     .0000     .0000
     -.3644+00 -.3993+03  .2007+02  .2008+02 -.3457+05
   HY                        REDUCED MATRICES   0/OK  36   FIFTH ORDER
      .5783+00 -.8128+00  .2437+03  .1110+00  .2663+02
      .3102-01  .3139-02 -.8877+00  .3129-03 -.3312-02
     -.2771-01 -.1262+00  .2341+01  .3069+00 -.6359+00
      .4654-04  .5694-04 -.1545-01  .1819-05 -.5107-04
      .1097-04  .5881-03 -.2988-02  .8220-04 -.6987-02
   DY                        REDUCED MATRICES   0/OK  36   FIFTH ORDER
     -.1647+00  .1538+00  .8941+01 -.2818+01  .3168+04
     -.7574-03  .7841+00  .4386+00  .3049-01  .1072+02
     -.4387-01  .2795+02 -.4957+00  .5806+00  .6792+03
     -.1347-04  .1711-01 -.1976-02  .5807-03  .2128+00
     -.3121-04 -.2497-01  .3936-03 -.8724-02 -.3752+00
```

36/0K/0

F11

	1	2
1	-3.9810+000	-1.3540+000
2	-8.1480-001	-2.5800+000

F12

	1	2	3
1	-4.5660+002	1.8170-001	1.4470+002
2	-2.3020+002	1.6120+000	4.1890+001

F21

	1	2
1	1.4460-002	-2.9000-002
2	0.0000	0.0000
3	1.7140+000	5.2520+000

F22

	1	2	3
1	-5.9050+000	-4.8700-003	9.4480-001
2	0.0000	-1.0000+001	0.0000
3	1.1780+002	2.3160+000	-1.6850+002

G1

	1	2
1	-4.6340-001	1.1340+003
2	-3.7360-001	-3.4270+002

G2

	1	2
1	-8.4090-003	-3.4810+001
2	1.0030+001	0.0000
3	-3.6440-001	-3.9930+002

H1

	1	2
1	5.7830-001	-8.1280-001
2	3.1020-002	3.1390-003
3	-2.7710-002	-1.2620-001
4	4.6540-005	5.6940-005
5	1.0970-005	5.8810-004

H2

	1	2	3
1	2.4370+002	1.1100-001	2.6630+001
2	-8.8770-001	3.1290-004	-3.3120-003
3	2.3410+000	3.0690-001	-6.3590-001

4	-1.5450-002	1.8190-006	-5.1070-005
5	-2.9880-003	8.2200-005	-6.9870-003

DI

	1	2
1	-1.6470-001	1.5380-001
2	-7.5740-004	7.8410-001
3	-4.3870-002	2.7950+001
4	-1.3470-005	1.7110-002
5	-3.1210-005	-2.4970-002

$\overline{F2}$

	1	2	3
1	-3.6968+000	-7.2746-002	1.6138+000
2	-7.1692+003	2.2453+001	1.6669+003
3	3.3519+002	6.6787-001	-2.0549+002

$\overline{F1}$

	1	2
1	-1.8825-002	6.1156-002
2	-3.9286+001	-5.8196+001
3	2.3848+000	7.8455+000

STATE RATE COMP. MATRIX

	1	2
1	-4.0871-003	1.1483-002
2	6.3025-002	1.6377+000
3	5.1436-003	6.2233-002

STATE INITIAL JUMP MATRIX

	1	2
1	-2.4480-003	6.7548-004
2	-1.6378-001	5.8430-001
3	-4.7535-003	7.6964-003

CONTROL INITIAL JUMP MATRIX

	1	2
1	-5.8836-001	-1.9469+000
2	6.4141-004	-7.9558-004

CONTROL RATE MATRIX

	1	2
1	6.3025-002	1.6377+000
2	1.2243-003	-1.7166-003

OUTPUT RATE MATRIX

	1	2
1	-2.8394-001	3.5547+000
2	3.5563-002	-9.3346-003
3	1.0247-002	2.4389-001
4	1.2964-004	-1.7210-004
5	-4.0112-005	2.4534-004

CONSTANT VELOCITY CONTROLLER 36 PLA 2/13/76

OUTPUT JUMP VECTOR

	1	2
1	-6.4433-001	7.5496-001
2	3.0861-003	4.0847-004
3	-9.2331-003	2.3918-001
4	5.6666-005	2.8458-006
5	2.9411-005	7.2864-005

•FIN

```
@ELT,IL   DATA
PROCESSED BY UNIVAC 1100 SERIES FIT PROCESSOR LEVEL W8 AT 2:43:38 PM ON TUESDAY, FEBRUARY 17, 1976  (CREATING CYCLE 0)

           CONSTANT VELOCITY CONTROLLER     24  PLA    2/17/76
       $OPTION  NX=5, NV=5, NU=5, NIND=2, REORD=.TRUE.     $END
          1     2     5     3     4
      F                        REDUCED MATRICES  0/OK  24    FIFTH ORDER
    -.1978+01  .5117+00 -.1099+04  .3138+01  .9825+02
    -.5220+00 -.3848+01  .2664+03 -.5877+00  .7594+02
     .5595-02 -.2507-01 -.7476+01 -.1016-01  .6302+00
     .0000     .0000     .0000    -.1000+02  .0000
     .6600+00  .5123+01 -.1816+03  .2727+01 -.1344+03
      G                        REDUCED MATRICES  0/OK  24    FIFTH ORDER
    -.1183+01 -.7731+03 -.8319+01 -.4360+00 -.1091+04
     .7752+00  .7162+03 -.6873+01 -.5312+02  .3578+04
     .6480-02 -.1505+02  .2601-01 -.2240+00  .5917+02
     .1000+02  .0000     .0000     .0000     .0000
    -.1263+01 -.4509+03  .8855+01  .5297+02 -.1301+05
      HY                       REDUCED MATRICES  0/OK  24    FIFTH ORDER
     .1910+00 -.4966+00  .3726+03  .3445-01  .1427+02
     .1827-01  .4974-02 -.2526+01  .5388-02 -.2949-01
    -.7082-01 -.2302+00  .6456+02  .4239+00 -.3745+00
     .4339-04  .1404-03 -.6891-01  .1540-03 -.8043-03
     .5151-04  .6669-03 -.6249-01  .2477-03 -.9369-02
      DY                       REDUCED MATRICES  0/OK  24    FIFTH ORDER
     .2193-01  .8467+02  .1200+01 -.5402+01  .2870+03
    -.3072-02 -.2623+01  .1547+00  .3382-01 -.1191+02
     .2376-01  .1293+03 -.9222+00 -.1622+01  .5232+03
    -.8377-04 -.6567-01 -.2070-02  .2230-02  .1828+00
    -.1688-03 -.1091+00  .9663-03 -.7591-02 -.1480+00

END ELT.  TIME: 0.8868 SECONDS.
```

24/0K/0

```
-.8377-04 -.6567-01 -.2070-02  .5239-02  .1828+00
-.1688-03 -.1091+00  .9663-03 -.7591-02 -.1480+00
```

F11

	1	2
1	-1.9780+000	5.1170-001
2	-5.2200-001	-3.8480+000

F12

	1	2	3
1	-1.0990+003	3.1380+000	9.8250+001
2	2.6640+002	-5.8770-001	7.5940+001

F21

	1	2
1	5.5950-003	-2.5070-002
2	0.0000	0.0000
3	6.6000-001	5.1230+000

F22

	1	2	3
1	-7.4760+000	-1.0160-002	6.3020-001
2	0.0000	-1.0000+001	0.0000
3	-1.8160+002	2.7270+000	-1.3440+002

G1

	1	2
1	-1.1830+000	-7.7310+002
2	7.7520-001	7.1620+002

G2

	1	2
1	6.4800-003	-1.5050+001
2	1.0000+001	0.0000
3	-1.2630+000	-4.5090+002

H1

	1	2
1	1.9100-001	-4.9660-001
2	1.8270-002	4.9740-003
3	-7.0820-002	-2.3020-001
4	4.3390-005	1.4040-004
5	5.1510-005	6.6690-004

H2

	1	2	3
1	3.7250+002	3.4450-002	1.4270+001
2	-2.5240+000	5.3880-003	-2.9490-002
3	6.4560+001	4.2390-001	-3.7450-001

4	-6.8910-002	1.5400-004	-8.0430-004
5	-6.2490-002	2.4770-004	-9.3690-003

D1

	1	2
1	2.1930-002	8.4670+001
2	-3.0720-003	-2.6230+000
3	2.3760-002	1.2930+002
4	-8.3770-005	-6.5670-002
5	-1.6880-004	-1.0910-001

CONSTANT VELOCITY CONTROLLER 24 PLA 2/17/76

$\overline{F2}$

	1	2	3
1	-5.5245+001	1.4215-001	1.4079+001
2	-2.3437+004	6.2314+001	5.2056+003
3	1.8024+003	-3.2470+000	-4.9000+002

$\overline{F1}$

	1	2
1	-1.7252-001	-3.4546-001
2	-7.3408+001	-1.0520+002
3	6.0201+000	1.0853+001

STATE RATE COMP. MATRIX

	1	2
1	-4.1833-003	1.2603-002
2	-3.0524-001	1.5802+000
3	-1.0793-003	5.8036-002

STATE INITIAL JUMP MATRIX

	1	2
1	-2.7400-003	7.2779-003
2	-2.5037-001	1.6396+000
3	-3.8495-003	1.9434-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	-2.8884+000	-3.1179+000
2	3.1263-003	4.7710-00[illegible]

CONTROL RATE MATRIX

	1	2
1	-3.0524-001	1.5802+000
2	2.4792-003	-5.8825-003

OUTPUT RATE MATRIX

	1	2
1	-1.1904+000	4.6185+000
2	2.1659-002	-9.4834-003
3	-1.5657-001	5.0850-001
4	1.4828-004	-2.7748-004
5	2.8470-005	1.0205-004

CONSTANT VELOCITY CONTROLLER   24 PLA   2/17/76

OUTPUT JUMP VECTOR

	1	2
1	-8.8312-001	3.3811+000
2	6.3586-003	-1.3059-002
3	5.4023-002	1.7004+000
4	1.9001-004	-3.1678-004
5	2.9175-004	-2.2497-004

*FIN

20/0K/0

F REDUCED MATRICES 0/0K 20 FIFTH ORDER

.5796+00	.1745+01	-.6247+04	.1220+02	.6937+02
-.1938+01	-.5041+01	.3156+04	-.5019+01	.1123+03
-.1728-02	-.2178-01	-.2258+00	-.2537-01	.6563+00
.0000	.0000	.0000	-.1000+02	.0000
.1454+01	.5349+01	-.2414+04	.6406+01	-.1508+03

G REDUCED MATRICES 0/0K 20 FIFTH ORDER

.7251+01	-.5214+04	.9810+01	.1362+02	-.1442+05
.4376+01	.3172+04	-.1411+02	-.3960+02	.5727+04
.2037-01	.2912+00	-.1806-01	-.2095+00	.3076+02
.1000+02	.0000	.0000	.0000	.0000
-.4050+01	-.2374+04	.1230+02	.5128+02	-.1074+05

HY REDUCED MATRICES 0/0K 20 FIFTH ORDER

.3807-01	-.3805+00	.6165+03	-.2254+00	.1186+02
.2649-01	.7874-02	-.1847+02	.3370-01	-.1245+00
-.2655+00	-.2828+00	.4247+03	.5154-01	.5047+00
.2627-03	.2521-03	-.5714+00	.1075-02	-.3967-02
.7124-03	.1778-02	-.1021+01	.2910-02	-.2587-01
.2334-03	.1298-03	-.3893+00	.6972-03	-.2580-02
.5175-03	.2122-03	-.6775-01	.1205-03	-.4688-03

DY REDUCED MATRICES 0/0K 20 FIFTH ORDER

.2375+00	.2334+03	.7572-01	-.3843+01	.1480+03
-.2169-01	-.1632+02	.1658+00	.6693-01	-.4801+02
.4186+00	.4031+03	-.1837+01	-.3732+01	.1006+04
-.7008-03	-.5225+00	-.2095-02	.2145-02	-.1548+01
-.1859-02	-.1314+01	.5353-02	.1265-01	-.2727+01
-.4875-03	-.3400+00	.1164-02	.9780-03	-.1092+01
-.7570-04	-.5856-01	.3251-03	.1463-03	-.1996+00

F11

	1	2
1	5.7960-001	1.7450+000
2	-1.9380+000	-5.0410+000

F12

	1	2	3
1	-6.2470+003	1.2200+001	6.9370+001
2	3.1560+003	-5.0140+000	1.1230+002

F21

	1	2
1	-1.7280-003	-2.1780-002
2	0.0000	0.0000
3	1.6540+000	5.3490+000

F22

	1	2	3
1	-2.2580-001	-2.5370-002	6.5630-001
2	0.0000	-1.0000+001	0.0000
3	-2.4140+003	6.0060+000	-1.5080+002

G1

	1	2
1	-7.2510+000	-5.2160+003
2	4.3760+000	3.1720+003

G2

	1	2
1	2.0370-002	2.9120-001
2	1.0000+001	0.0000
3	-4.0500+000	-2.3740+003

CONSTANT VELOCITY CONTROLLER 20 0/0K 3/10/76

H1

	1	2
1	3.8070-002	-3.8050-001
2	2.6420-002	7.8740-003
3	-2.6550-001	-2.8280-001
4	2.6270-004	2.5210-004
5	7.1240-004	1.7780-003
6	2.3340-004	1.2980-004
7	5.1750-005	2.1220-005

H2

	1	2	3
1	6.1050+002	-3.2540-001	1.1860+001
2	-1.8470+001	3.3700-002	-1.2450-001
3	4.2470+002	5.1540-002	6.0470-001
4	-5.9140-001	1.0750-003	-3.9870-003
5	-1.6210+000	2.9100-003	-2.5870-002
6	-3.8930-001	6.9720-004	-2.5600-003
7	-6.7750-002	1.2050-004	-4.6680-004

DT

	1	2
1	2.3750-001	2.3940+002
2	-2.1890-002	-1.5320+001
3	4.1660-001	4.0810+002
4	-7.0080-004	-5.2250-001
5	-1.9590-003	-1.3140+000
6	-4.4750-004	-3.4000-001
7	-7.5700-005	-5.6560-002

CONSTANT VELOCITY CONTROLLER 20 0/0K 3/10/76

$\overline{F2}$

	1	2	3
1	-3.8329+002	1.4069+000	9.2614+001
2	-1.9169+005	7.0706+002	4.6057+004
3	1.4802+004	-5.2911+001	-3.6357+003

$\overline{F1}$

	[illegible]	2
1	-9.4544-001	-2.3906+000
2	-4.7270+002	-1.1865+003
3	3.6833+001	9.3519+001

STATE RATE COMP. MATRIX

	1	2
[illegible]	-5.3899-003	1.1105-002
2	-4.6641-001	1.3158+000
3	-6.3166-003	5.1961-002

STATE INITIAL JUMP MATRIX

	1	2
1	-1.2154-002	2.2809-002
2	-1.3042+000	3.0513+000
3	-2.6540-002	5.0591-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	-1.8130+001	-2.9513+001
2	2.5012-002	4.1445-002

CONTROL RATE MATRIX

	1	2
1	-1.4641-001	1.3158+000
2	6.0721-003	-1.1078-002

OUTPUT RATE MATRIX

	1	2
1	-1.8996+000	4.4725+000
2	2.2334-002	-8.1745-003
3	-2.2965-001	5.8106-001
4	1.3175-004	-2.6764-004
5	1.0568-004	3.0961-004
6	1.6941-004	-2.4925-004
7	1.3625-005	-5.0771-00[illegible]

CONSTANT VELOCITY CONTROLLER 20 0/0K 3/10/76

OUTPUT JUMP VECTOR

	1	2
1	-5.5332+000	1.4663+001
2	1.7253-001	-3.4902-001
3	-2.4272+000	1.4311+001
4	5.5293-003	-1.1189-002
5	1.6817-002	-2.0909-002
6	3.5004-003	-7.6435-003
7	5.4556-004	-1.3734-003

F REDUCED MATRICES 1.2/0K 83 FIFTH ORDER

-.9065+01	-.6753+00	-.5895+03	.3414+00	.1322+03
-.1911+01	-.7451+01	.1613+03	-.1955+00	.4126+02
.4140-02	-.5856-01	-.9024+01	.1125-01	.5889+00
.0000	.0000	.0000	-.1000+02	.0000
.5159+01	.1067+02	-.1545+02	.1770+01	-.1722+03

G REDUCED MATRICES 1.2/0K 83 FIFTH ORDER

-.3175-01	-.6505+02	-.3220+03	.5037+01	.4062+05
.6603+00	.2567+04	-.1002+03	-.9450+02	.1395+05
-.2316-02	-.1346+03	.5657+00	-.7936+00	-.1436+03
.1000+02	.0000	.0000	.0000	.0000
-.5180+00	-.1555+04	.2309+03	.1831+03	-.1149+06

HY REDUCED MATRICES 1.2/0K 83 FIFTH ORDER

-.8363+00	-.3330+01	.3622+03	-.7918+00	.4397+02
.3377-01	.1003-02	-.6902-01	.6047-03	-.1661-02
-.4510-01	-.4856-01	.1004+02	.4316-01	-.1499+00
.2487-04	.6247-04	-.4408-02	.1025-04	-.1178-03
.2510-04	.3439-03	-.3801-02	.1833-04	-.1732-02

DY REDUCED MATRICES 1.2/0K 83 FIFTH ORDER

.6524+00	.2676+04	-.4649+02	-.5429+02	.2585+05
-.1187-03	.1147+01	.1849+01	.1907-01	.9036+01
.3271-01	.1555+03	-.4023+01	-.3139+01	.1557+04
-.7690-05	-.2718-01	-.5934-02	.1253-02	-.1195+00
-.1662-04	-.5679-01	.2948-02	.9115-03	-.1168+00

83/0K/1.2

F11

	1	2
1	-9.0380+000	-6.9530-001
2	-1.9110+000	-8.4310+000

F12

	1	2	3
1	-5.8950+002	3.4140-001	1.3220+002
2	1.6130+002	-1.9550-001	4.1260+001

F21

	1	2
1	4.1400-003	-3.8860-002
2	0.0000	0.0000
3	5.1580+000	1.0570+001

F22

	1	2	3
1	-9.0290+000	1.1250-002	5.8890-001
2	0.0000	-1.0000+001	0.0000
3	-1.5450+001	1.7700+000	-1.7220+002

G1

	1	2
1	-3.1750-002	-6.5050+001
2	6.6030-001	2.5670+003

G5

	1	2
1	-2.3160-003	-1.3460+002
2	1.0000+001	0.0000
3	-5.1840-001	-1.5550+003

CONSTANT VELOCITY CONTROLLER 83 1.2/0K 3/10/76

H1

	1	2
1	-8.3030-001	-3.3340+000
2	3.3770-002	1.0030-003
3	-4.5100-002	-9.8560-002
4	2.4370-005	6.2470-005
5	2.5100-005	3.4390-004

H2

	1	2	3
1	3.6220+002	-7.9180-001	4.3970+001
2	-6.9620-002	6.0470-004	-1.6610-003
3	1.0340+001	4.3140-002	-1.4990-001
4	-4.4080-003	1.0250-005	-1.1780-004
5	-3.2010-003	1.8330-005	-1.7320-003

D1

	1	2
1	6.5240-001	2.6700+003
2	-1.1570-004	1.1870+000
3	3.2710-002	1.5550+002
4	-7.6900-006	-2.7080-002
5	-1.6620-005	-5.6790-002

CONSTANT VELOCITY CONTROLLER 83 1.2/0K 3/10/76

$\overline{F2}$

	1	2	3
1	-1.2000+003	7.6781-001	2.8940+002
2	-3.4482+005	2.2735+002	8.4727+004
3	4.6983+003	-1.1590+000	-1.1979+003

$\overline{FT}$

	1	2
1	-1.9565+001	-2.4363+000
2	-6.0572+003	-6.0526+002
3	7.5726+001	1.2930+001

STATE RATE COMP. MATRIX

	1	2
1	-9.0756-005	2.7365-002
2	4.8474-001	5.5950+000
3	2.7153-002	1.1271-001

STATE INITIAL JUMP MATRIX

		2
1	-2.4558-003	2.5796-003
2	-1.2380-001	1.1925+000
3	-2.8739-003	8.5308-003

CONTROL INITIAL JUMP MATRIX

	1	2
1	-6.6584+001	-1.6874+000
2	1.7129-002	8.2361-004

CONTROL RATE MATRIX

	1	2
1	4.8174-001	5.5950+000
2	7.9052-004	-1.2598-003

OUTPUT RATE MATRIX

	1	2
1	-8.4646-001	7.3898+000
2	3.5520-002	1.2827-004
3	1.0415-002	3.8788-001
4	4.1510-005	-2.2992-005
5	-3.1497-005	1.2578-004

CONSTANT VELOCITY CONTROLLER 63 1,2/0K 3/10/76

OUTPUT JUMP VECTOR

	1	2
1	1.3797+000	1.4633+000
2	2.6334-002	1.7051-003
3	4.5598-001	1.4896-001
4	5.6038-005	-9.4794-006
5	1.3595-004	-2.1449-005

```
F                        REDUCED MATRICES        .9/30K    83        FIFTH ORDER
 .5343+00 -.3397+01 -.6636+03 -.1508+01  .1716+03
 .4143+00 -.2581+01 -.3232+03  .1257+01  .4778+02
-.5760-03 -.2186-02 -.1140+02  .1815-01  .5625+00
 .0000     .0000     .0000    -.1000+02  .0000
-.2831+01  .4939+01  .4975+03  .2764+01 -.2055+03
G                        REDUCED MATRICES        .9/30K    83        FIFTH ORDER
 .6093+00  .1463+04  .3017+00 -.1607+02  .3956+05
-.5142+00  .3115+03  .5712+01 -.2761+02  .8607+03
-.8009-02 -.5320+02  .7238-01 -.7199-01 -.7723+02
 .1000+02  .0000     .0000     .0000     .0000
-.2206+00 -.1639+04 -.5699+02  .2972+02 -.6033+05
HY                       REDUCED MATRICES        .9/30K    83        FIFTH ORDER
 .1836+01 -.1234+01  .3916+02 -.2398+00  .5232+02
 .7861-02 -.6894-04 -.4625-02  .1405-03  .1006-02
 .2007+00 -.1119+00  .1766+01  .2295+00 -.6033+00
 .2873-03 -.7255-04 -.1170-01 -.1002-03  .1333-02
-.1283-03  .2064-03  .1107-01  .9024-04 -.6596-02
 .1307-03 -.1069-03 -.8465-02 -.9412-04  .1559-02
 .3714-02 -.1637-04 -.1920-02 -.2582-04  .3177-03
MY                       REDUCED MATRICES        .9/30K    83        FIFTH ORDER
-.1095+00  .5378+03  .2547+02 -.7258+01  .1165+05
 .2507-04  .3506+00  .3545+00 -.2901-03  .1067+01
-.5912-01  .1353+03  .3825+01 -.1905+00  .2573+04
 .3167-04  .9493-01  .6202-02 -.1031-03  .1307+01
 .1065-04 -.4030-01 -.2701-02 -.1125-02 -.1406+01
 .2221-04  .1038+00  .3726-02 -.3964-03  .1257+01
 .7336-05  .2979-01  .1164-02 -.4050-05  .3249+00
```

83/30K/0.9


```
F11
                          2
   1    5.3430-001 -3.3470+000
   2    4.1430-001 -2.5810+000

F12
             1           2           3
   1   -4.6360+002 -1.5080+000  1.7160+002
   2   -3.2320+002  1.2570+000  4.7780+001

F21
             1           2
   1   -5.7600-004 -2.1860-003
   2    0.0000      0.0000
   3   -2.8310+000  4.9390+000

F22
             1           2           3
   1   -1.1400+001  1.8150-002  5.6250-001
   2    0.0000     -1.0000+001  0.0000
   3    4.9750+002  2.7640+000 -2.0550+002
```

G1

	1	2
1	6.0930-001	1.4630+003
2	-5.1420-001	3.1150+002

G2

	1	2
1	-5.0090-003	-5.8200+001
2	1.0000+001	0.0000
3	-2.2060-001	-1.6390+003

CONSTANT VELOCITY CONTROLLER 83 .9/30K 3/10/76

H1

	1	2
1	1.0360+000	-1.2340+000
2	7.8610-003	-6.8940-005
3	2.0070-001	-1.1190-001
4	2.8730-004	-7.9550-005
5	-1.2830-004	2.0640-004
6	1.3170-004	-1.0690-004
7	3.7140-005	-1.6370-005

H2

	1	2	3
1	3.9160+001	-2.3980-001	5.2320+001
2	-4.6250-003	1.4050-004	1.0060-003
3	1.7880+000	2.2950-001	-8.0330-001
4	-1.1700-002	-1.0020-004	1.3330-003
5	1.1370-002	9.4240-005	-6.5960-003
6	-8.4650-003	-9.8120-005	1.5590-003
7	-1.9240-003	-2.5820-005	3.1770-004

DT

	1	2
1	-1.0950-001	8.3780+002
2	2.5070-005	3.6060-001
3	-5.9120-002	1.3530+002
4	3.1670-005	9.4930-002
5	-1.0660-005	-9.0300-002
6	2.2210-005	1.0380-001
7	7.34[illegible]-006	2.0740-002

CONSTANT VELOCITY CONTROLLER 63 .9/30K 3/10/76

$\overline{F2}$

	1	2	3
1	-4.2384+001	-2.0060-003	7.6723+000
2	-2.9249+003	1.4507+001	1.7460+002
3	-3.7644+002	2.2068+000	-5.1598+000

$\overline{F1}$

	1	2
1	2.8254-002	-1.8415-001
2	4.6672+000	-2.8850+001
3	-2.0168+000	-1.9451-001

STATE RATE COMP. MATRIX

	1	2
1	-2.1165-002	2.7699-002
2	-2.9819+000	5.2351+000
3	-1.2100-001	1.7843-001

STATE INITIAL JUMP MATRIX

	1	2
1	-1.5046-002	1.6497-002
2	-2.3761+000	3.4528+000
3	-2.2032-002	2.2957-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	3.3065-001	-1.5530+000
2	5.0582-004	8.4677-004

CONTROL RATE MATRIX

	1	2
1	-2.9519+000	5.2351+000
2	2.4428-003	-2.8265-003

OUTPUT RATE MATRIX

	1	2
1	-3.0565+000	4.9894+000
2	8.2239-003	-1.7003-004
3	8.2831-002	3.0582-001
4	4.0434-004	-7.9287-004
5	-3.1631-005	2.8302-005
6	5.8459-004	-7.3305-004
7	1.6700-004	-1.9363-004

CONSTANT VELOCITY CONTROLLER 83 .9/30K 3/10/76

OUTPUT TEMP VECTOR

	1	2
1	-3.9902+000	5.7074+000
2	-1.4167-004	7.0266-004
3	-4.5203-001	9.2173-001
4	3.6707-004	-3.9485-004
5	9.7780-005	-1.8656-004
6	2.8712-004	-2.7770-004
7	8.2945-005	-8.1670-005

20/30K/0.9

REDUCED MATRICES .9/30K 20 FIFTH ORDER

F

-.1165+01	-.2701+00	-.5692+03	.8823+00	.1254+03
-.4420-01	-.1917+01	-.1477+03	.2002+01	.3949+02
.5084-02	-.7273-02	-.7281+01	.1215-01	.3930+00
.0000	.0000	.0000	-.1000+02	.0000
.2387+00	.2106+01	.1078+03	.1558+01	-.1179+03

REDUCED MATRICES .9/30K 20 FIFTH ORDER

G

-.4799+00	.7741+02	-.4832+01	-.2920+01	.5111+04
-.5220+00	.9291+01	-.3386+01	-.1777+02	-.1187+04
-.2045-02	-.1535+02	.2788-01	-.1049+00	-.1435+02
.1000+02	.0000	.0000	.0000	.0000
-.4277+00	-.5317+02	.5820+01	.2942+02	-.7152+04

REDUCED MATRICES .9/30K 20 FIFTH ORDER

HY

-.3453-01	-.4638+00	.2527+03	.2820+00	.2485+02
.1098-01	.1606-02	-.7546+00	.5055-03	.7600-03
-.1272-01	-.1054+00	-.1902+01	.9933+00	-.1687+00
.1154-03	.1119-03	-.4980-01	.2031-04	.5328-04
.3569-04	.2146-03	.1330-01	.8800-04	-.1485-01
.9430-04	.9043-05	-.6570-01	-.1638-04	.4788-03
.3382-04	.2661-05	-.1075-01	-.5360-05	.1051-03

REDUCED MATRICES .9/30K 20 FIFTH ORDER

DY

-.2201+00	-.3230+01	-.1341+01	-.6884+01	.7897+03
-.4553-03	-.1350+00	.9174-01	.2596-01	.8694+00
-.2019+00	.1658+02	-.7278+00	-.2899+01	.5980+03
-.3219-04	-.1843-01	-.4068-02	.1880-02	-.7642-01
-.1637-04	.1266-02	.7235-03	-.3498-02	-.1352+00
-.2044-04	.6149-02	.1027-03	.1039-03	.1427+00
-.3042-05	.2284-02	.2046-03	.3654-04	.3245-01

F11

	1	2
1	-1.1650+000	-2.7010-001
2	-4.4200-002	-1.9170+000

F12

	1	2	3
1	-5.6920+002	8.8230-001	1.2540+002
2	-1.4770+002	2.0020+000	3.9490+001

F21

	1	2
1	5.0840-003	-7.2730-003
2	0.0000	0.0000
3	2.3870-001	2.1060+000

F22

	1	2	3
1	-7.2810+000	1.2150-002	3.9300-001
2	0.0000	-1.0000+001	0.0000
3	1.0780+002	1.5580+000	-1.1790+002

G1

	1	2
1	-4.7990-001	7.7410+001
2	-5.2200-001	9.2910+000

G2

	1	2
1	-2.6450-003	-1.5350+001
2	1.0000+001	0.0000
3	-4.2770-001	-5.3170+001

H1

	1	2
1	-3.4830-002	-4.6350-001
2	1.0980-002	1.6060-003
3	-1.2720-002	-1.0540-001
4	1.1540-004	1.1100-004
5	3.5690-005	2.1460-004
6	2.6340-005	9.0430-006
7	3.3820-005	2.6610-006

H2

	1	2	3
1	2.5270+002	2.8200-001	2.4880+001
2	-7.5460-001	5.0550-004	7.6000-004
3	-1.9020+000	9.9330-001	-1.6670-001
4	-4.9590-002	2.0310-005	5.3280-005
5	1.3340-002	8.8000-005	-1.4850-002
6	-6.5740-002	-1.6380-005	4.7860-004
7	-1.4750-002	-5.3600-006	1.0510-004

DT

	1	2
1	-2.2910-001	-3.2300+000
2	-4.8530-004	-1.3500-001
3	-2.0190-001	1.6580+001
4	-3.2190-005	-1.8430-002
5	-1.6370-005	1.2060-003
6	-2.0460-005	8.4490-003
7	-3.0420-006	2.2840-003

CONSTANT VELOCITY CONTROLLER .9/30K 3/10/76

$\overline{F2}$

	1	2	3
1	-9.0129+001	-2.0978-001	2.0144+001
2	-1.8644+003	3.0829+001	5.2625+002
3	-1.0075+002	-9.2807-001	-7.1622+001

$\overline{F1}$

	1	2
1	-2.4595-001	3.1271-001
2	2.0591+000	-3.8425+001
3	-7.1744-001	4.8307+000

STATE RATE COMP MATRIX

	1	2
1	-3.0123-003	9.5188-003
2	-1.9300-001	1.1548+000
3	-3.2786-003	3.9093-002

STATE INITIAL JUMP MATRIX

	1	2
1	-3.1847-003	2.5475-003
2	-1.9208-001	7.3421-001
3	-5.3082-003	9.1258-003

CONTROL INITIAL JUMP MATRIX

	1	2
1	2.5545-001	-2.1533+000
2	1.4520-002	-1.3349-002

CONTROL RATE MATRIX

	1	2
1	-1.9300-001	1.1548+000
2	1.5491-003	-3.2278-003

OUTPUT RATE MATRIX

	1	2
1	-8.9283-001	2.9858+000
2	1.3038-002	-5.0881-003
3	-1.3350-001	7.3031-001
4	2.3925-004	-3.1564-004
5	3.2329-005	-1.6031-004
6	3.1300-004	-6.6782-004
7	8.3067-005	-1.5071-004

CONSTANT VELOCITY CONTROLLER .9/30K 3/10/76

OUTPUT JUMP VECTOR

	1	2
1	-1.0971+000	1.6143+000
2	2.1637-004	1.3029-003
3	4.7255-003	9.3633-001
4	-1.2123-004	2.0345-004
5	3.3591-005	-1.6574-005
6	3.2736-004	-2.4386-004
7	7.9825-005	-6.4401-005

F REDUCED MATRICES .9/45K 83 FIFTH ORDER

-.9606+00	-.5966+00	-.1111+04	.1337+01	.1297+03
.7065+00	-.1644+01	-.2648+03	-.1910+00	.6773+02
.2590-02	-.5191-02	-.8586+01	.7394-02	.5756+00
.0000	.0000	.0000	-.1000+02	.0000
-.7438+00	.1816+01	.6572+03	.1725+01	-.1697+03

G REDUCED MATRICES .9/45K 83 FIFTH ORDER

-.2392+00	-.3610+03	-.2723+02	-.8061+01	.2800+04
.4113-01	.5968+02	.1747+02	-.1417+02	.7194+04
-.6548-03	-.2077+02	.9120-01	-.7441-01	-.3711+01
.1000+02	.0000	.0000	.0000	.0000
-.2039+00	-.1936+03	-.1259+02	.1411+02	-.1924+05

HY REDUCED MATRICES .9/45K 83 FIFTH ORDER

.3706+00	-.4559+00	-.4317-01	-.7515-01	.4308+02
.4325-02	.1905-05	-.1318-01	.2221-03	.4375-05
.1495+00	-.9064-01	-.3614-02	.4196+00	-.1059+01
.2069-03	.1662-05	-.6021-01	.1165-04	.2939-03
-.6204-04	.1524-03	.4799-01	.8306-04	-.1107-01
.5705-04	-.3729-04	-.4392-01	-.4372-04	.7977-03
.1677-04	.3318-05	-.1152-01	-.8746-05	.4938-04

DY REDUCED MATRICES .9/45K 83 FIFTH ORDER

.5229-02	.2362+03	.9048+01	-.3097+01	.3379+04
.6354-06	.2040+00	.1799+00	.3743-03	.1546+01
.1379-01	.5129+02	.2443+01	-.4394+00	.1930+04
.9607-06	.2573-01	.7359-03	.1406-03	.5909+00
-.2569-04	-.1331-01	-.1070-02	-.1621-02	-.4019+00
.1918-04	.2556-01	.1901-02	-.2397-03	.2633+00
.2497-06	.3067-02	.6714-03	.4867-04	.6065-01

F11

1	-9.6060-001	-5.9660-001
2	7.2550-001	-1.6440+000

F12

	1	2	3
1	-1.1110+003	1.3370+000	1.2970+002
2	-2.6480+002	-1.9100-001	6.7730+001

F21

		2
1	2.5900-003	-5.1810-003
2	0.0000	0.0000
3	-7.4380-001	1.8160+000

F22

	1	2	3
1	-8.5860+000	7.3940-003	5.7560-001
2	0.0000	-1.0000+001	0.0000
3	6.5720+002	1.7250+000	-1.6970+002

83/45K/0.9

G1

	1	2
1	-2.3920-001	-3.6100+002
2	4.1130-002	8.4680+001

G2

	1	2
1	-6.5430-004	-2.0770+001
2	1.0000+001	0.0000
3	-2.9390-001	-1.9360+002

H1

	1	2
1	3.7060-001	-4.5590-001
2	4.3250-003	1.9050-006
3	1.4950-001	-9.0040-002
4	2.0680-004	1.8620-006
5	-6.2040-005	1.5240-004
6	5.7050-005	-3.7290-005
7	1.6770-005	3.3180-006

H2

	1	2	3
1	-4.3170-002	-7.5150-002	4.3080+001
2	-1.3180-002	2.2210-004	4.3750-006
3	-3.6140+001	4.1960-001	-1.0590+000
4	-6.0210-002	1.1550-005	2.9390-004
5	4.7490-002	8.3060-005	-1.1070-002
6	-4.3920-002	-4.3720-005	7.9770-004
7	-1.1520-002	-5.7460-006	4.9380-005

D1

	1	2
1	5.2290-003	2.3820+002
2	6.3540-007	2.0400-001
3	1.3790-002	5.1290+001
4	3.6070-007	2.5730-002
5	-2.5620-005	-1.2910-002
6	1.4160-005	2.8560-002
7	2.8970-006	9.0670-003

CONSTANT VELOCITY CONTROLLER   83   .9/45K   3/10/76

$\overline{F2}$

	1	2	3
1	-4.0122+002	3.7470-002	7.8311+001
2	-3.4609+005	7.1033+001	6.4999+004
3	7.0180+003	-3.4402-001	-1.3158+003

$\overline{F1}$

	1	2
1	5.5194-001	-1.5185+000
2	3.7695+002	-1.1807+003
3	-6.4717+000	2.1691+001

STATE RATE COMP. MATRIX

	1	2
1	-8.8104-003	1.1447-002
2	-1.2729+000	2.2908+000
3	-5.1579-002	7.6940-002

STATE INITIAL JUMP MATRIX

	1	2
1	-2.9652-003	1.1343-002
2	-1.1277-001	2.6036+000
3	-1.3381-002	6.8073-002

CONTROL INITIAL JUMP MATRIX

	1	2
1	-1.5559+001	-6.6173+001
2	7.5394-003	4.3547-002

CONTROL RATE MATRIX

	1	2
1	-1.2729+000	2.2908+000
2	2.0516-003	-2.2711-003

OUTPUT RATE MATRIX

	1	2
1	-1.2733+000	2.1570+000
2	4.5759-003	-1.0170-004
3	7.6089-002	2.9111-001
4	7.5665-004	-6.9425-004
5	-2.7753-005	2.6536-005
6	4.2406-004	-6.1119-004
7	1.3181-004	-1.5679-004

CONSTANT VELOCITY CONTROLLER 63 .9/45K 3/10/76

OUTPUT JUMP VECTOR

	1	2
1	1.1467+000	1.2836+001
2	1.5421-003	9.3317-003
3	2.4615-001	1.9468+000
4	3.5233-004	4.3197-004
5	2.4606-004	8.3354-004
6	1.1919-004	-2.4378-004
7	5.7920-005	5.6648-005

40/45K/0.9

F REDUCED MATRICES .9/45K FIFTH ORDER

-.1240+01	-.2122+00	-.6898+03	.1015+01	.1379+03
-.1770+00	-.1118+01	-.4216+02	.8145+00	.4023+02
.3813-02	-.4516-02	-.6903+01	.6139-02	.5977+00
.0000	.0000	.0000	-.1000+02	.0000
.5693+00	.1153+01	.1599+03	.1937+01	-.1471+03

G REDUCED MATRICES .9/45K FIFTH ORDER

-.3443+00	.2838+02	-.1923+02	-.1408+01	.3773+04
-.2524-01	.5956+02	-.4376+01	-.3766+01	.6751+03
-.4069-02	-.1240+02	.6582-01	-.5301-01	.1103+02
.1000+02	.0000	.0000	.0000	.0000
-.5640+00	-.5148+02	.1069+02	.9987+01	-.8360+04

LY REDUCED MATRICES .9/45K FIFTH ORDER

.2410-01	-.2771+00	.1682+03	.2467+00	.3695+02
.8884-02	.5066-03	-.7332+00	.1050-02	-.1090-01
.6096-01	-.4208-01	-.1898+02	.1172+01	-.1318+01
.1757-04	.4964-04	-.6708-01	.1069-03	-.1005-02
.4611-04	.3104-03	.8234-02	.2505-03	-.2230-01
.7711-04	-.7919-05	-.9015-01	.5651-04	-.9653-05
.2681-04	.5645-05	-.2224-01	.1459-04	-.1707-03

DY REDUCED MATRICES .9/45K FIFTH ORDER

-.2263+00	.1341+02	-.6193+00	-.2783+01	.1221+04
-.3870-03	-.3094+00	.1540+00	.7410-02	-.1484+01
-.2063+00	.5002+01	-.1506+01	-.1992+01	.7402+03
-.3529-04	-.2652-01	-.2014-02	.7072-03	-.1570+00
-.1163-03	-.1758-01	.1625-02	-.3813-03	-.2695+00
-.7547-06	-.1912-01	.2761-03	-.1730-04	-.1198+00
.7938-06	-.4312-02	.5248-03	.1034-03	-.3601-01

F11

	1	2
1	-1.2440+000	-2.1220-001
2	-1.7700-001	-1.1180+000

F12

	1	2	3
1	-6.8980+002	1.0150+000	1.3790+002
2	-4.2160+001	8.1450-001	4.0230+001

F21

	1	2
1	3.8130-003	-4.5160-003
2	0.0000	0.0000
3	5.6930-001	1.1530+000

F22

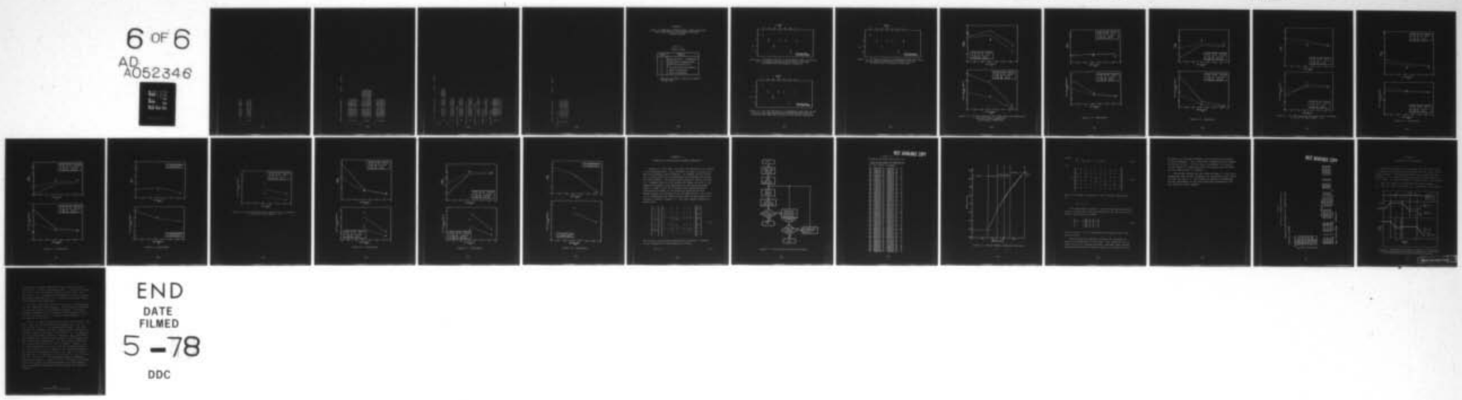
	1	2	3
1	-6.9030+000	6.1390-003	5.9770-001
2	0.0000	-1.0000+001	0.0000
3	1.5990+002	1.9370+000	-1.4710+002

AD-A052 346 SYSTEMS CONTROL INC PALO ALTO CALIF AERONAUTICAL AND--ETC F/G 21/5
F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM. VOLUME II. APPEND--ETC(U)
JUN 77 R L DE HOFF, W E HALL, R J ADAMS F33615-75-C-2053

UNCLASSIFIED AFAPL-TR-77-35-VOL-2 NL

6 OF 6

AD A052346



END
DATE
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5-78
DDC

G1

	1	2
1	-3.4430-001	2.8380+001
2	-2.5240-002	5.9560+001

G2

	1	2
1	-4.0490-003	-1.2400+001
2	1.0000+001	0.0000
3	-5.6400-001	-5.1480+001

CONSTANT VELOCITY CONTROLLER .9/45K 3/10/76

H1

	1	2
1	-2.0100-002	-2.7710-001
2	8.8840-003	5.4660-004
3	-5.0960-002	-4.2080-002
4	1.7570-005	4.9940-005
5	4.6110-005	4.1040-004
6	7.7110-005	-7.0190-006
7	2.6810-005	6.6450-006

H2

	1	2	3
1	1.6820+002	2.4670-001	3.6950+001
2	-7.3320-001	1.0500-003	-1.0900-002
3	-1.9980+001	1.1720+000	-1.3180+000
4	-6.7080-002	1.0690-004	-1.0050-003
5	8.2340-003	2.5050-004	-2.2300-002
6	-9.1150-002	5.6510-005	-9.6530-006
7	-2.2240-002	1.4890-005	-1.7070-004

DT

	1	2
1	-2.2030-001	1.3410+001
2	-3.8700-004	-3.0940-001
3	-2.0030-001	6.4020+000
4	-3.5290-005	-2.6820-002
5	-1.1530-004	-1.7550-002
6	-7.5470-007	-1.9120-002
7	7.9380-007	-4.3120-003

CONSTANT VELOCITY CONTROLLER .7/45K 3/10/76

$\overline{F2}$

	1	2	3
1	3.0924+000	1.5508-001	5.6345+000
2	-2.0155+000	8.8669+000	3.5733+003
3	1.3042+003	1.5558+000	-3.2160+002

$\overline{F1}$

	1	2
1	-4.2661-004	-2.4629-001
2	-3.4901+001	9.6463+000
3	2.4609+000	-3.7643-001

STATE RATE COMP. MATRIX

	1	2
1	-1.4561-003	4.5957-003
2	-2.6557-002	7.5088-001
3	1.6200-003	2.0231-002

STATE INITIAL JUMP MATRIX

	1	2
1	-2.0394-003	3.2614-003
2	-4.0729-002	9.2767-001
3	-7.9873-003	1.2291-002

CONTROL INITIAL JUMP MATRIX

		2
1	-3.0096+000	1.0380+000
2	-1.2794-003	1.7398-002

CONTROL RATE MATRIX

	1	2
1	-2.6557-002	7.5088-001
2	1.1288-003	-1.7332-003

OUTPUT RATE MATRIX

	1	2
1	-1.9378-001	1.2064+000
2	9.5054-003	-1.8628-005
3	-5.3431-002	5.6185-001
4	7.9561-005	-1.6500-004
5	-2.6608-005	1.2662-004
6	1.6325-004	-3.2434-004
7	5.3331-005	-7.5319-005

CONSTANT VELOCITY CONTROLLER .9/45K 3/10/76

OUTPUT JUMP VECTOR

	1	2
1	1.9245-001	1.1490+000
2	3.1444-003	-7.4589-003
3	6.0762-001	5.2466-001
4	2.7549-004	-6.8917-004
5	4.1292-004	-8.3695-004
6	2.6823-004	-5.7543-004
7	4.8370-005	-1.3470-004

APPENDIX I

EFFECT OF COMPONENT DETERIORATION, POWER EXTRACTION AND BLEED FLOW ON F100 TURBOFAN CONTROL SYSTEM DESIGNS

Table I.1

Index of Data

FIGURE	COMMENTS
I.1	Altitude Points - Intermediate
I.2	Power Data for Nominal Deter-
I.3	ioration and Bleed Flow
I.4	Sea Level Static Performance*
I.5	30K/0.9 Performance*
I.6	10K/0.9 Performance*

*Data for each effect is given as a function of power level

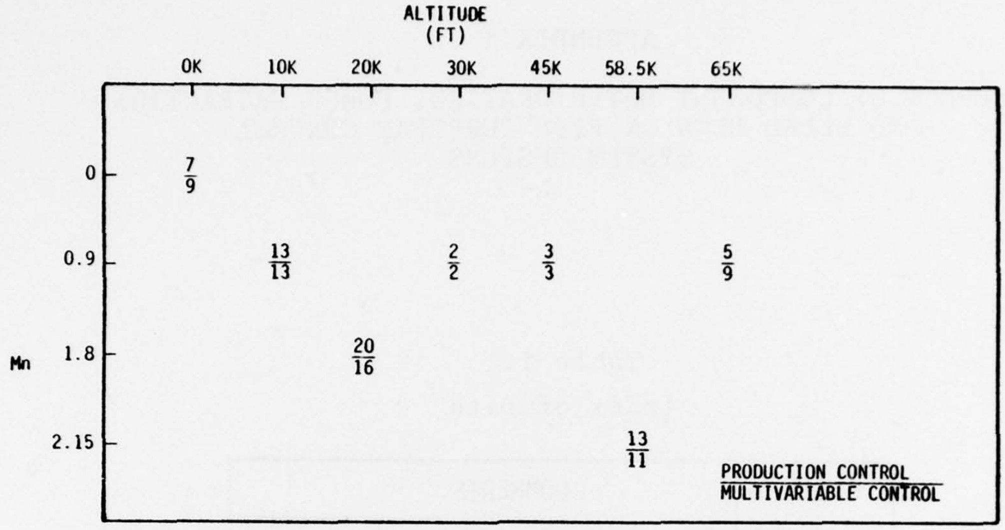


Figure I.1 Per Cent Variation in Intermediate Power Net Thrust Due to Component Deterioration at Various Altitudes and Velocities from Digital Evaluation

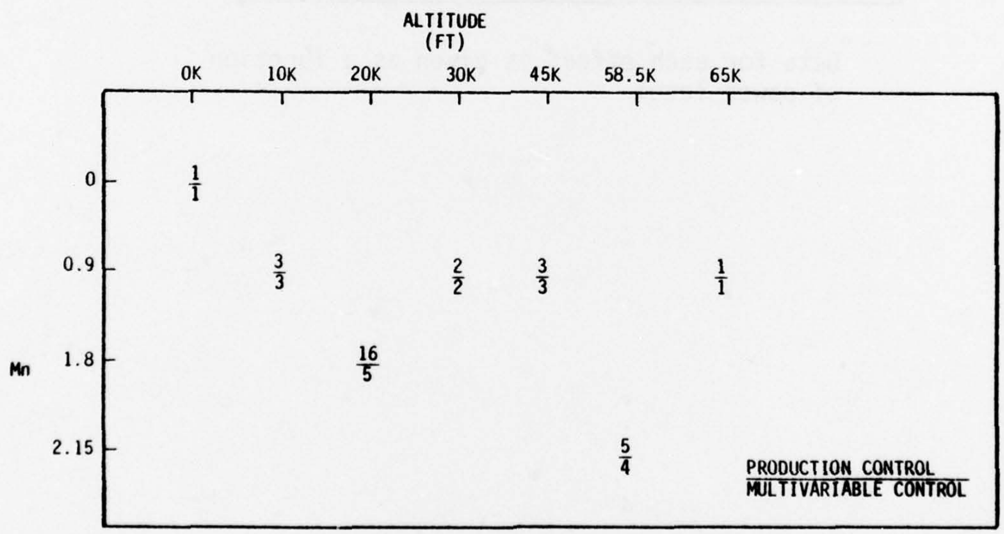


Figure I.2 Per Cent Variation in Intermediate Power Net Thrust Specific Fuel Consumption Due to Component Deterioration at Various Altitudes and Velocities from Digital Evaluation

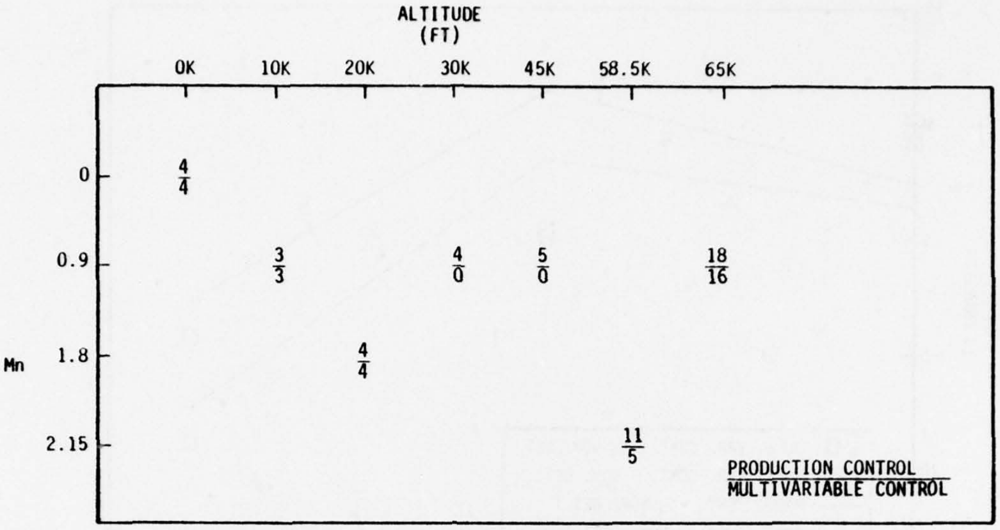
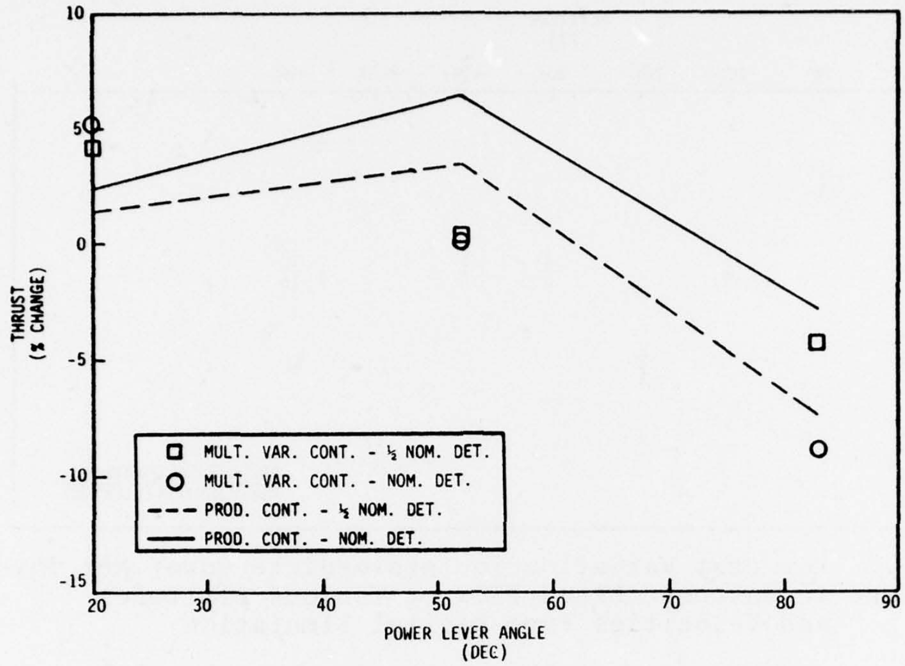


Figure I.3 Per Cent Variation in Intermediate Power Net Thrust Due to Customer Bleed Flow at Various Altitudes and Velocities from Digital Simulation



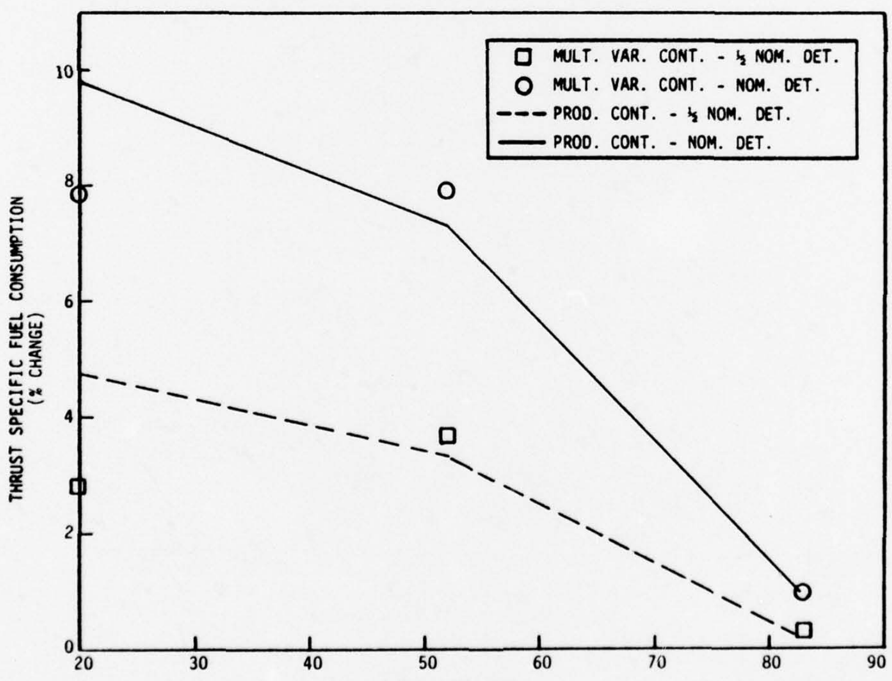
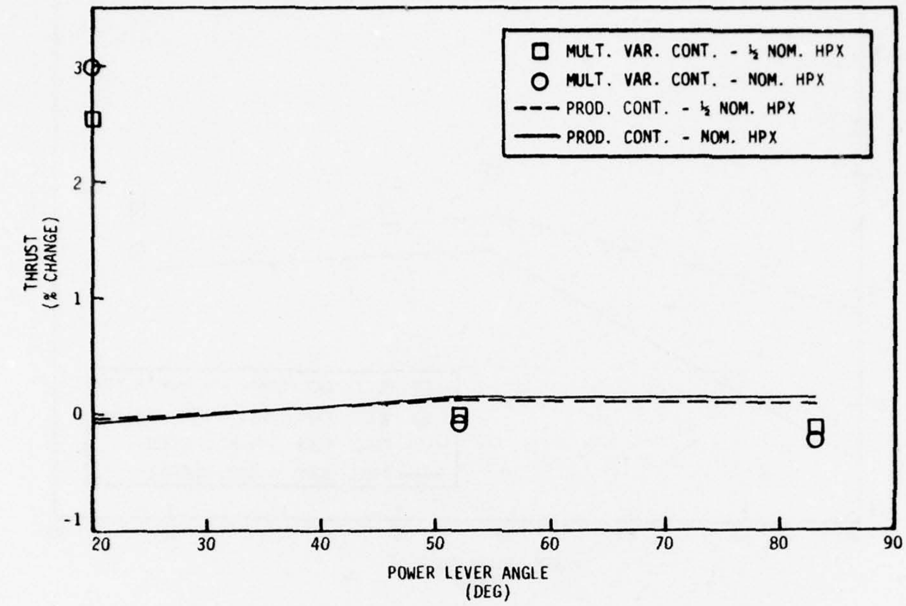


Figure I.4 Per Cent Variation in Steady-State Performance at Sea Level Static Conditions from Digital Simulation



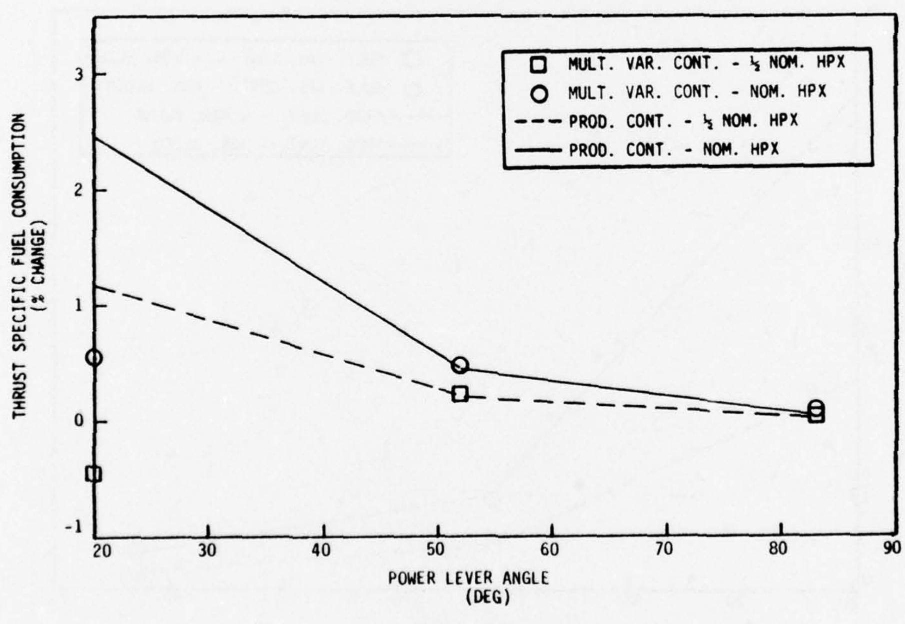
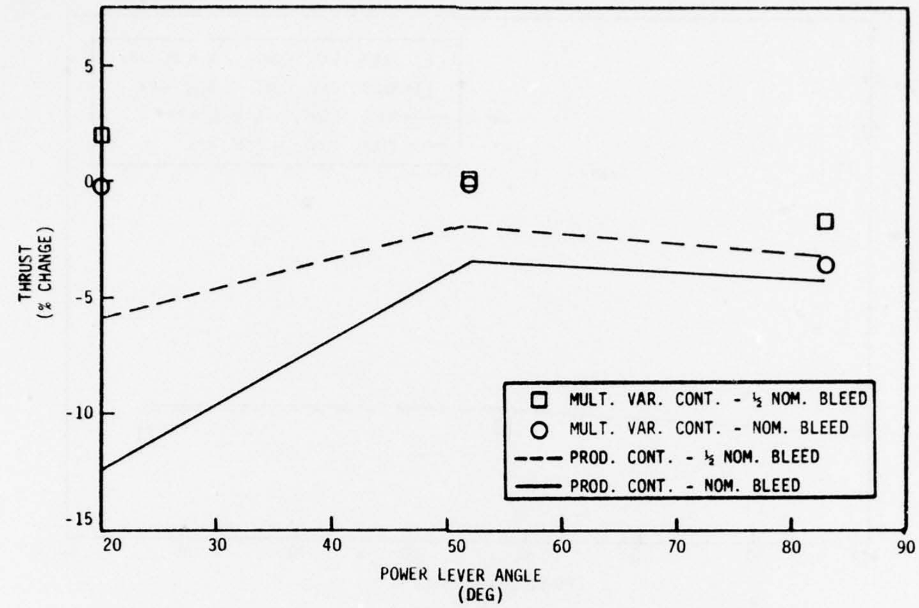


Figure I.4 (Continued)



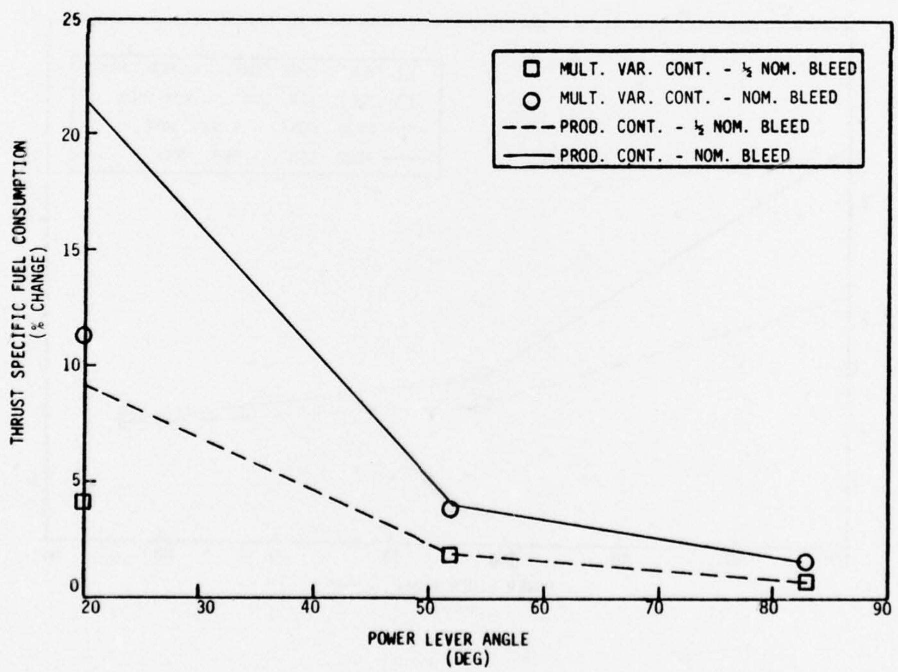


Figure I.4 (Continued)

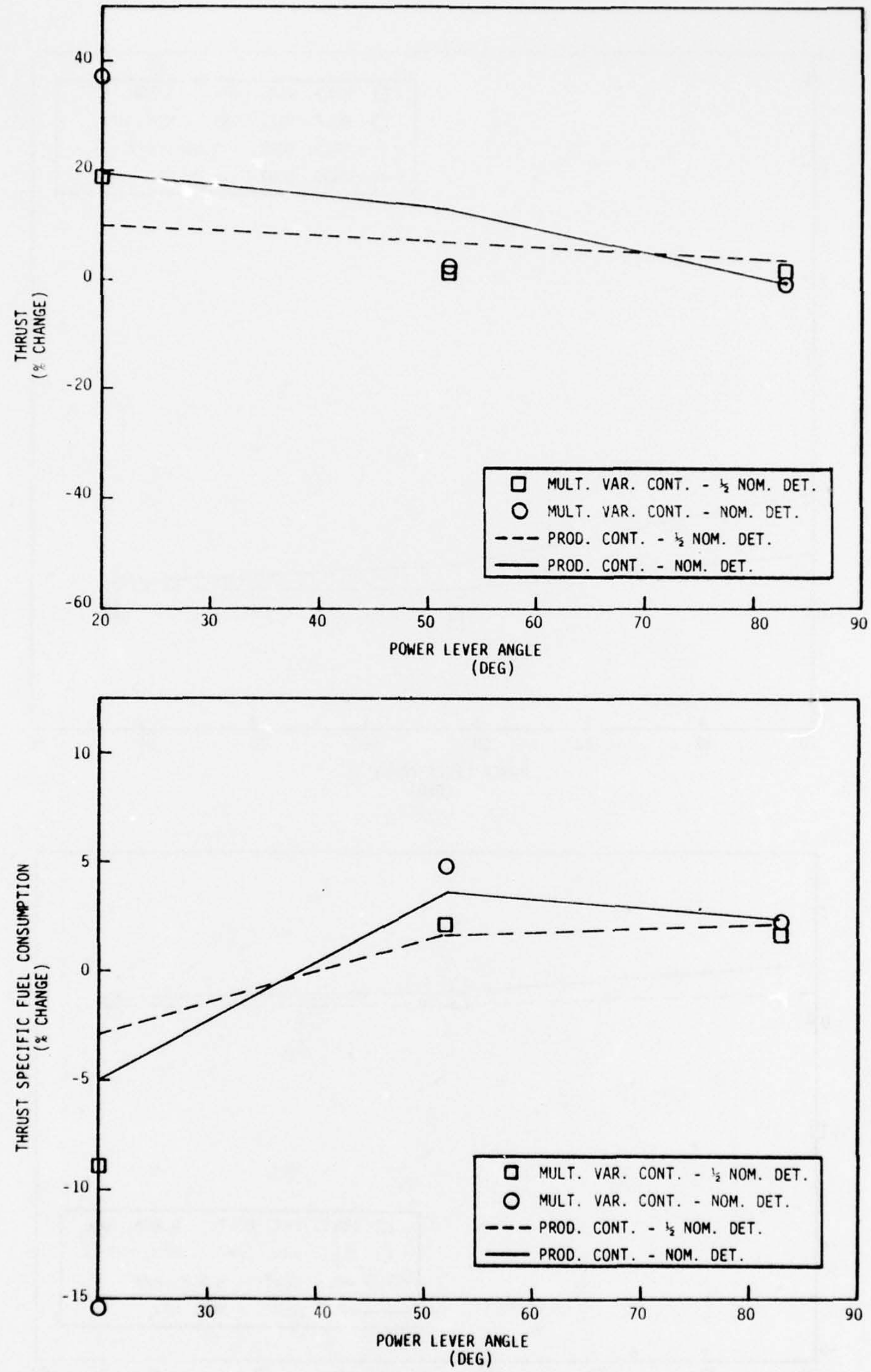
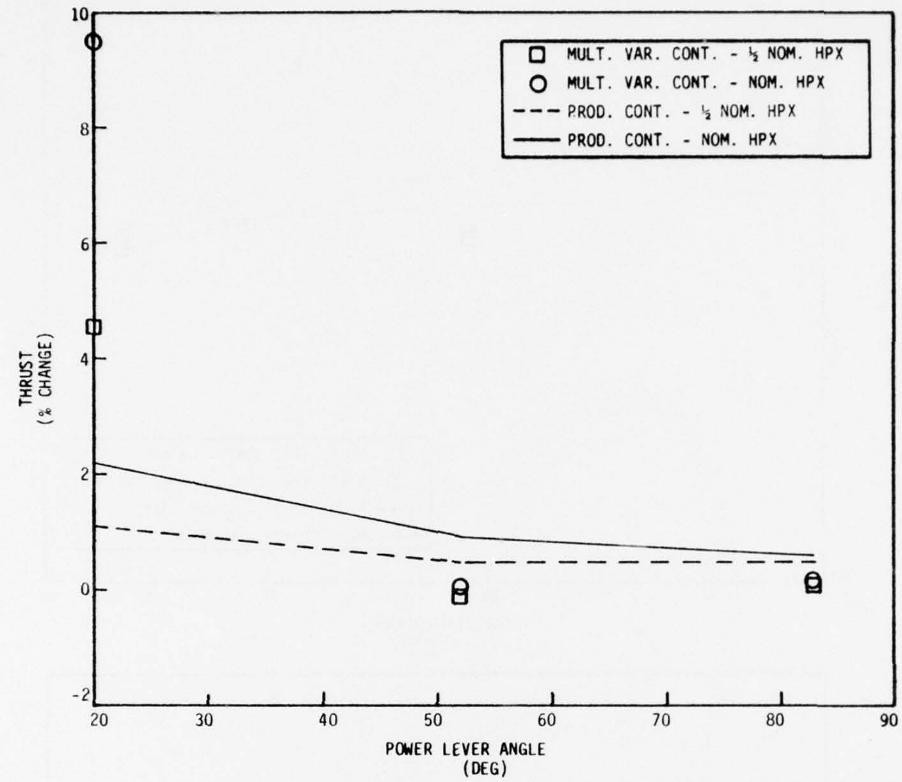


Figure I.5 Per Cent Variation in Steady-State Performance at 30,000 Ft, Mach Number = 0.9



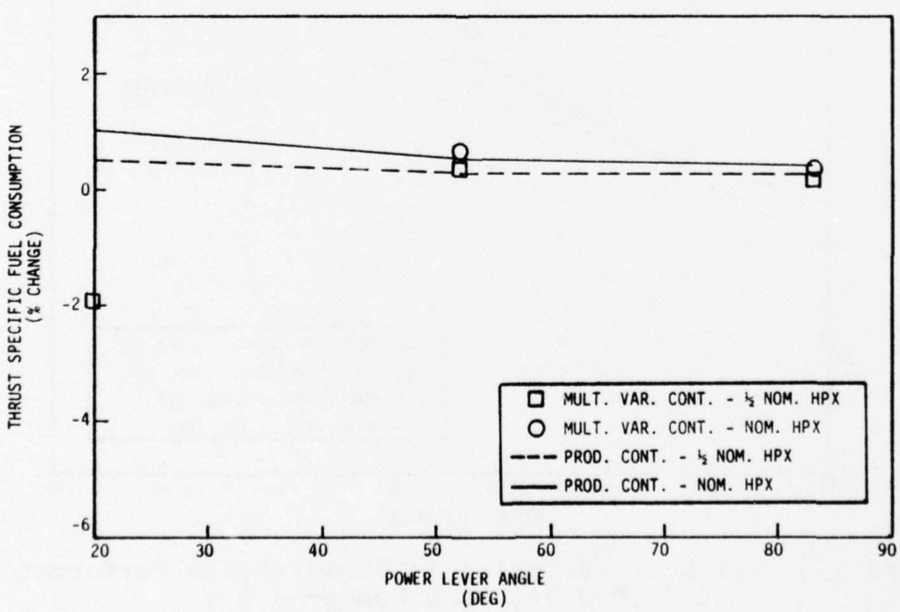
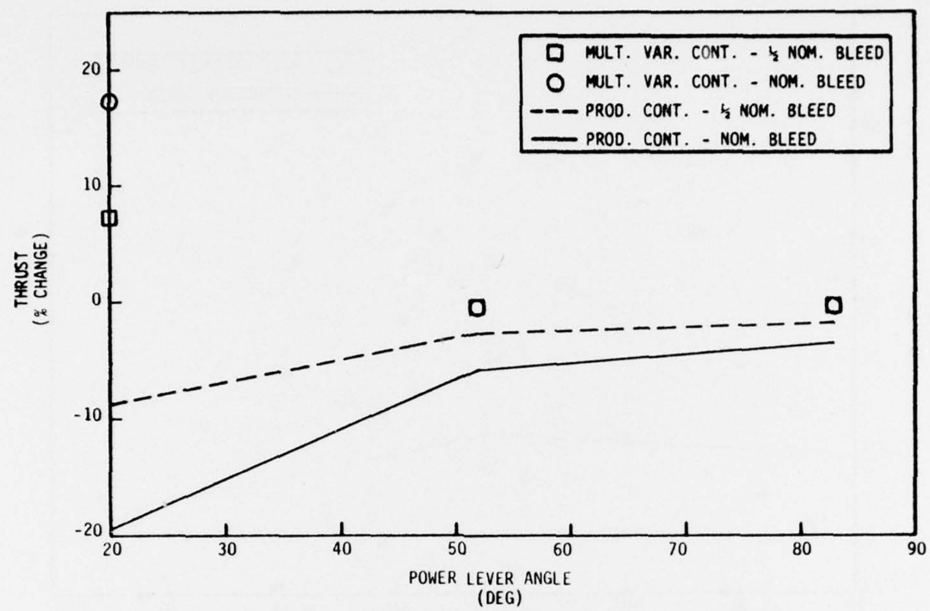


Figure I.5 (Continued)



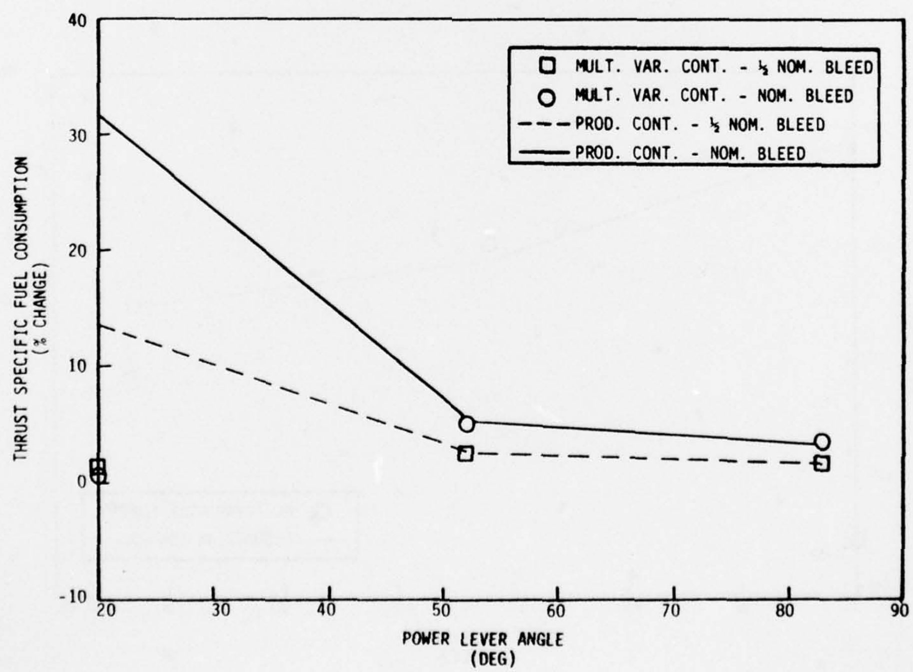
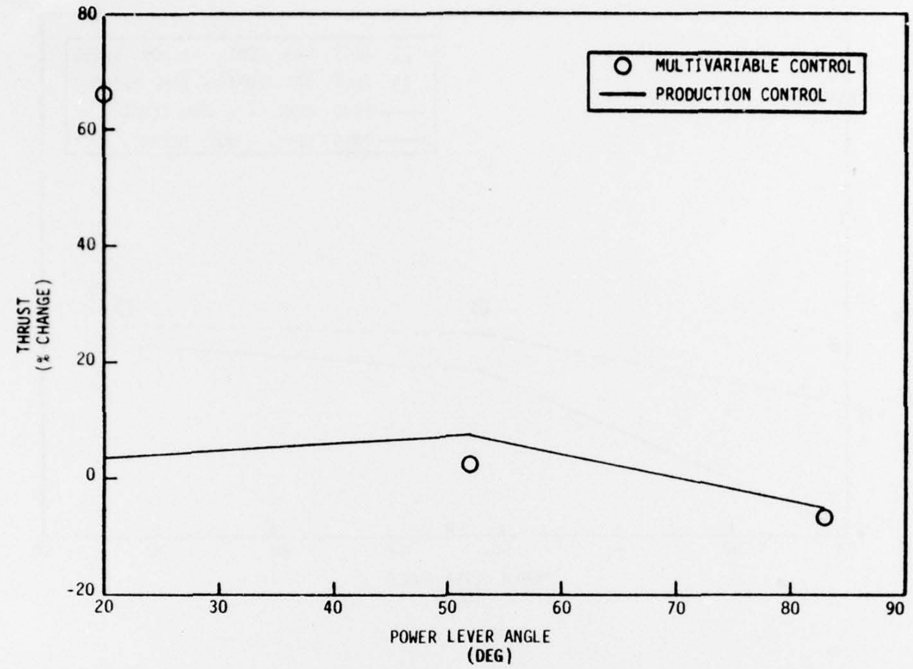


Figure I.5 (Continued)



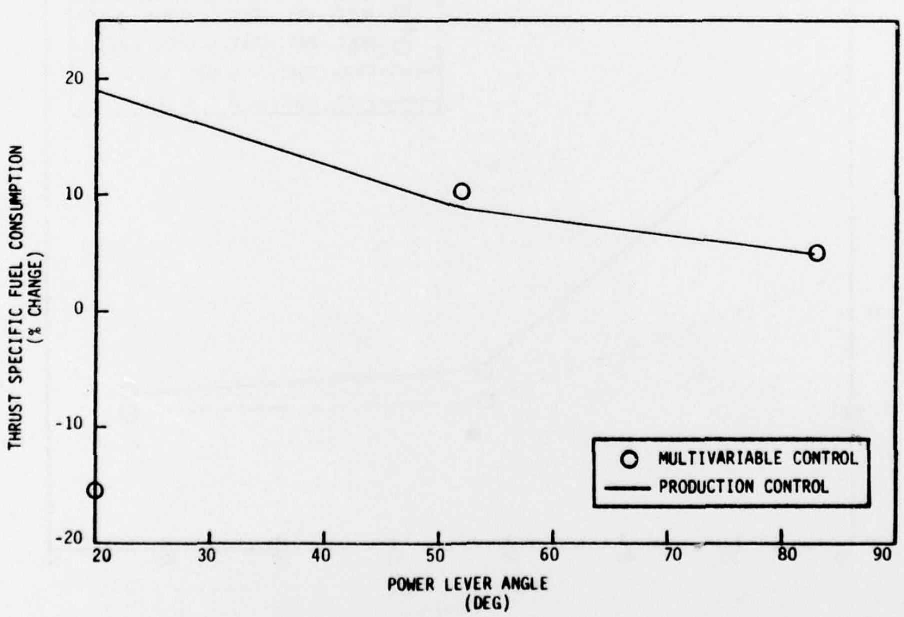


Figure I.5 (Continued)

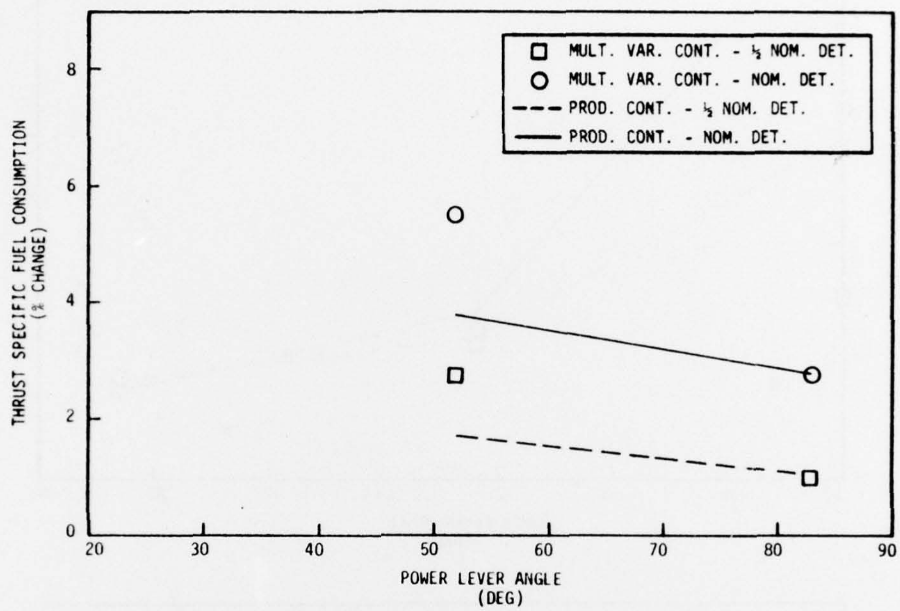


Figure I.6 Per Cent Variation in Steady-State Performance at 10,000 Ft, Mach Number = 0.9

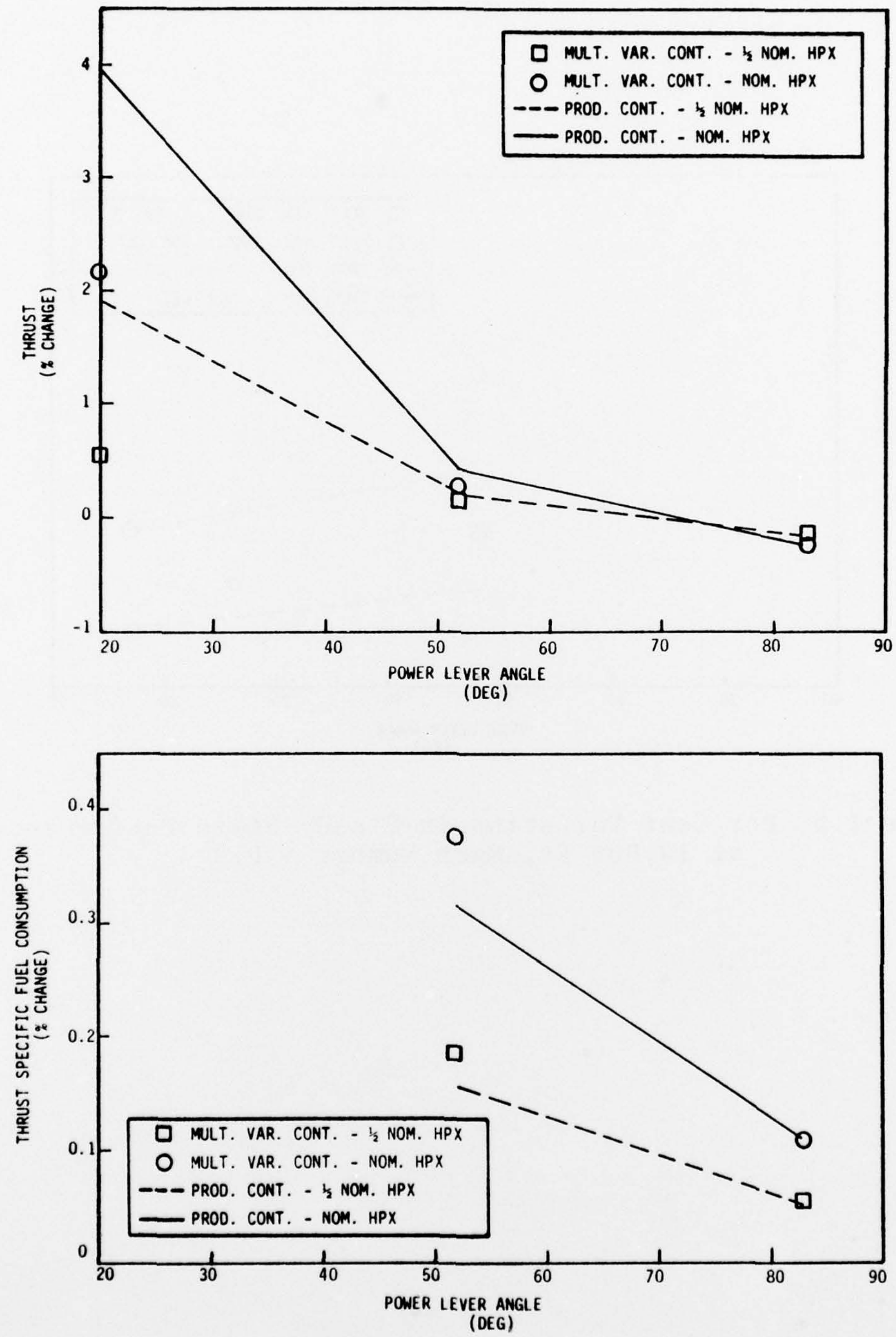
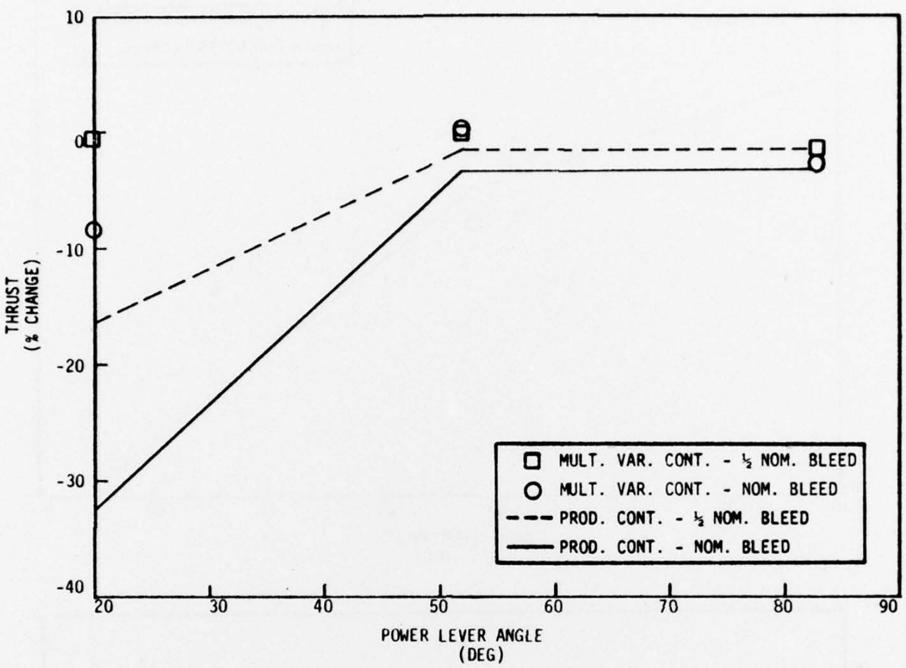


Figure I.6 (Continued)



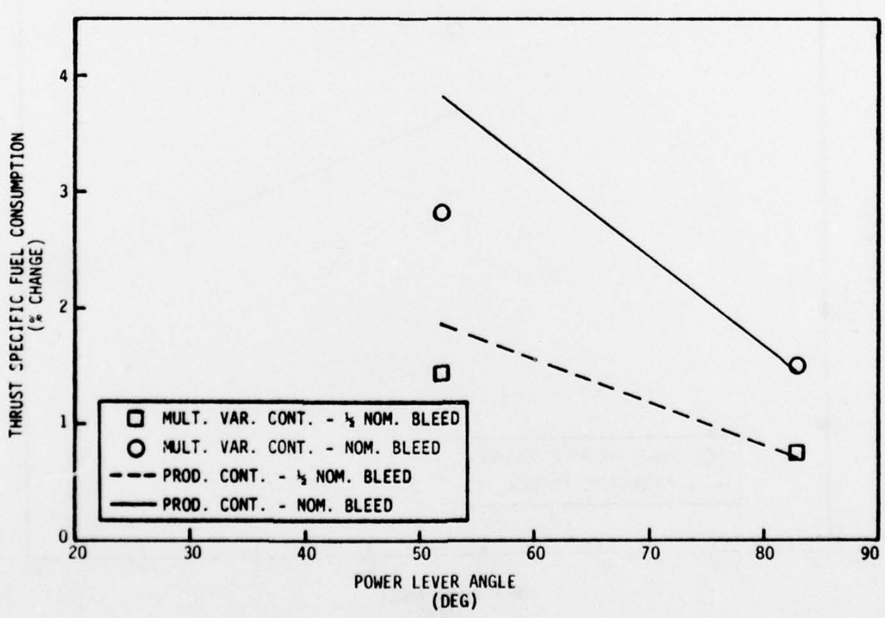


Figure I.6 (Continued)

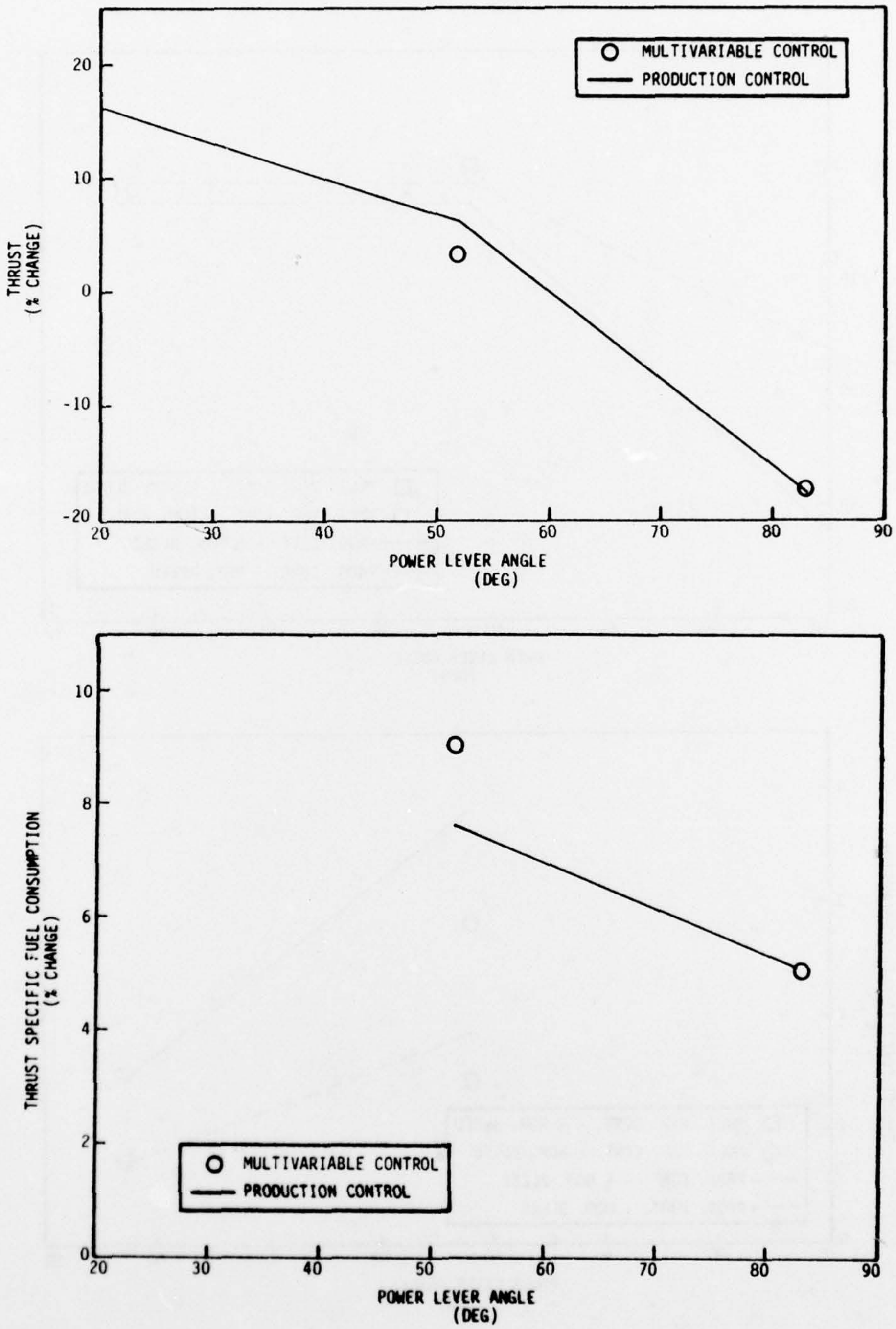


Figure I.6 (Continued)

APPENDIX J

EXAMPLE OF LINEAR SPLINE SCHEDULE GENERATION

Section 4.4 of Volume I describes the utilization of splines to fit operating data. This procedure is useful in generating gain and reference point schedules. An example of this procedure is given below for the generation of an optimum fan operating line schedule. The program flow diagram is shown in Figure J.1. Schedule data for two dimensional tables are read in and weighted according to the importance of the operating point. Table J.1 shows a list of 62 steady state operating points represented by values of corrected fan speed and airflow. Higher weights are attached to low altitude points. An initial set of breakpoints are chosen and the data is partitioned into regions as shown in Figure J.2. The least squares problem is shown below:

$$\begin{bmatrix} y_1 \\ \vdots \\ y_p \\ \hline y_{p+1} \\ \vdots \\ y_q \\ \hline y_{q+1} \\ \vdots \end{bmatrix} = \left[\begin{array}{cc|cc|c} x_1 & 1 & 0 & 0 & 0 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ x_p & 1 & 0 & 0 & 0 \\ \hline 0 & 0 & x_{p+1} & 1 & 0 \ldots \\ \vdots & \vdots & & & \\ 0 & 0 & x_q & 1 & 0 \ldots \\ \hline 0 & 0 & 0 & 0 & x_{q+1} \\ \vdots & \vdots & \vdots & \vdots & \vdots \end{array}\right] \begin{bmatrix} a_1 \\ b_1 \\ \hline a_2 \\ b_2 \\ \hline \vdots \end{bmatrix} \qquad (J.1)$$

The parameter constraints representing continuity of splines at the breakpoints is represented as follows:

$$L\theta = 0 \qquad (J.2)$$

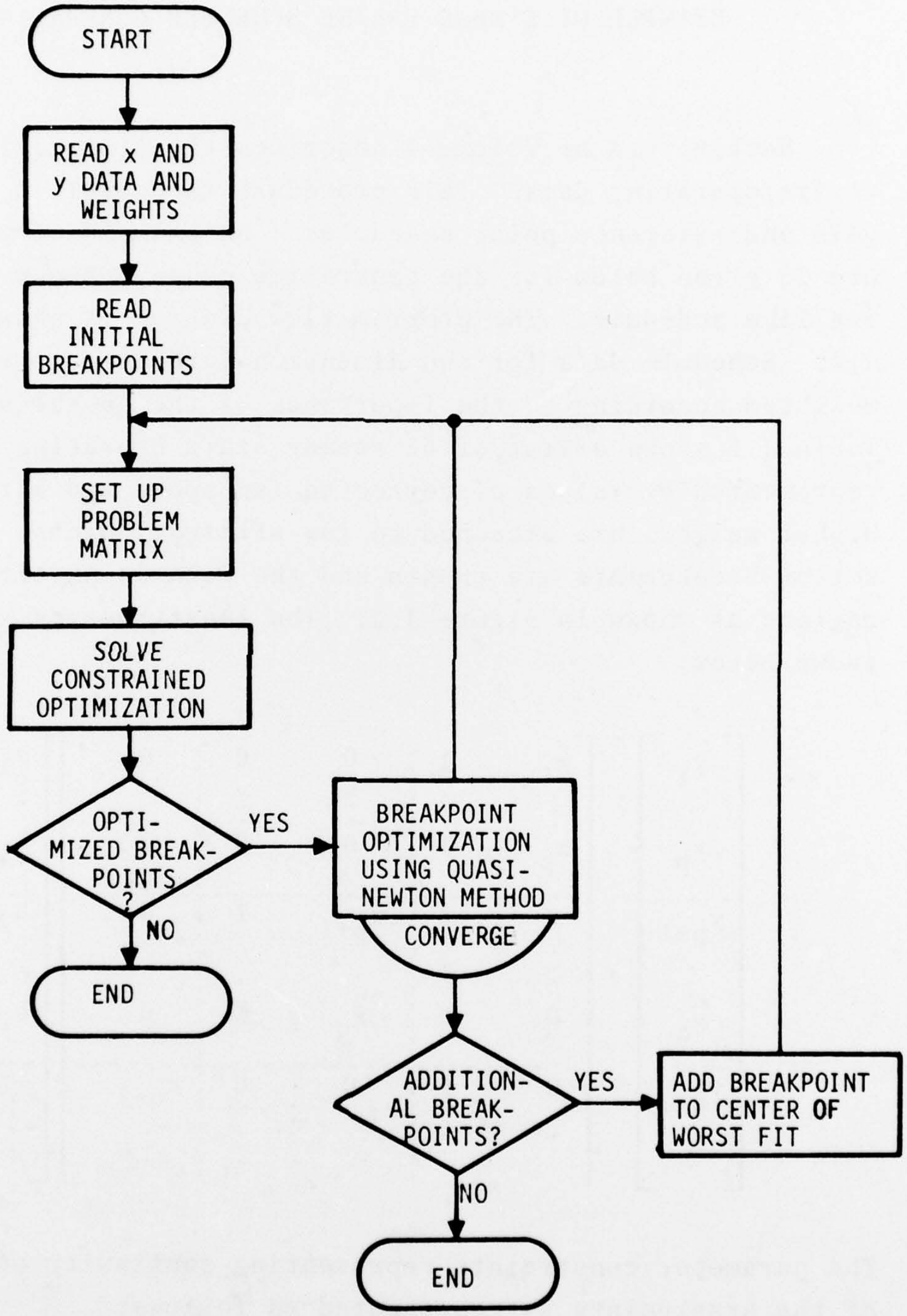


Figure J.1 Spline Table Generation Program

Table J.1

Weighted Operating Point Data List

SPLINE FITTING PROGRAM: FAN OPERATING LINE

X= WCF Y= δNFCR W = WEIGHTING

~~X=~~	~~.73600+02~~	~~Y=~~	~~.38930+04~~	~~W=~~	~~20~~
X=	.87200+02	Y=	.45660+04	W=	1
X=	.94500+02	Y=	.49440+04	W=	1
~~X=~~	~~.99800+02~~	~~Y=~~	~~.53530+04~~	~~W=~~	~~1~~
X=	.11110+03	Y=	.59130+04	W=	1
X=	.11900+03	Y=	.63240+04	W=	1
~~X=~~	~~.11900+03~~	~~Y=~~	~~.63250+04~~	~~W=~~	~~1~~
X=	.12400+03	Y=	.66490+04	W=	20
X=	.13080+03	Y=	.69030+04	W=	1
~~X=~~	~~.13150+03~~	~~Y=~~	~~.69120+04~~	~~W=~~	~~1~~
X=	.13170+03	Y=	.69420+04	W=	1
X=	.14050+03	Y=	.72710+04	W=	1
~~X=~~	~~.14100+03~~	~~Y=~~	~~.73420+04~~	~~W=~~	~~1~~
X=	.14100+03	Y=	.73420+04	W=	1
X=	.14580+03	Y=	.74670+04	W=	1
~~X=~~	~~.14600+03~~	~~Y=~~	~~.74740+04~~	~~W=~~	~~1~~
X=	.14990+03	Y=	.75990+04	W=	1
X=	.14990+03	Y=	.75990+04	W=	1
~~X=~~	~~.15200+03~~	~~Y=~~	~~.77150+04~~	~~W=~~	~~20~~
X=	.15600+03	Y=	.78280+04	W=	0
X=	.15760+03	Y=	.78780+04	W=	1
~~X=~~	~~.15770+03~~	~~Y=~~	~~.79250+04~~	~~W=~~	~~1~~
X=	.16000+03	Y=	.79860+04	W=	1
X=	.16090+03	Y=	.79930+04	W=	1
~~X=~~	~~.16360+03~~	~~Y=~~	~~.81610+04~~	~~W=~~	~~1~~
X=	.16470+03	Y=	.81730+04	W=	1
X=	.16600+03	Y=	.82480+04	W=	1
~~X=~~	~~.16780+03~~	~~Y=~~	~~.83730+04~~	~~W=~~	~~1~~
X=	.17000+03	Y=	.84080+04	W=	1
X=	.17000+03	Y=	.83700+04	W=	1
~~X=~~	~~.17730+03~~	~~Y=~~	~~.86170+04~~	~~W=~~	~~1~~
X=	.17870+03	Y=	.86420+04	W=	1
X=	.18000+03	Y=	.87560+04	W=	20
~~X=~~	~~.18200+03~~	~~Y=~~	~~.88140+04~~	~~W=~~	~~1~~
X=	.18240+03	Y=	.87650+04	W=	1
X=	.18700+03	Y=	.89680+04	W=	1
~~X=~~	~~.19000+03~~	~~Y=~~	~~.90580+04~~	~~W=~~	~~1~~
X=	.19100+03	Y=	.91660+04	W=	1
X=	.19100+03	Y=	.91510+04	W=	1
~~X=~~	~~.19270+03~~	~~Y=~~	~~.93050+04~~	~~W=~~	~~1~~
X=	.19650+03	Y=	.92710+04	W=	1
X=	.19740+03	Y=	.92800+04	W=	1
~~X=~~	~~.19900+03~~	~~Y=~~	~~.43610+04~~	~~W=~~	~~1~~
X=	.19900+03	Y=	.93610+04	W=	1
X=	.20240+03	Y=	.94910+04	W=	1
~~X=~~	~~.20300+03~~	~~Y=~~	~~.94380+04~~	~~W=~~	~~20~~
X=	.20400+03	Y=	.94840+04	W=	1
X=	.20700+03	Y=	.95400+04	W=	1
~~X=~~	~~.21270+03~~	~~Y=~~	~~.96990+04~~	~~W=~~	~~1~~
X=	.21400+03	Y=	.97500+04	W=	1
X=	.21600+03	Y=	.98970+04	W=	1
~~X=~~	~~.21800+03~~	~~Y=~~	~~.98540+04~~	~~W=~~	~~1~~
X=	.21830+03	Y=	.99110+04	W=	1
X=	.22370+03	Y=	.10137+05	W=	1
~~X=~~	~~.22500+03~~	~~Y=~~	~~.10144+05~~	~~W=~~	~~1~~
X=	.22640+03	Y=	.10439+05	W=	1
X=	.22980+03	Y=	.10273+05	W=	1
~~X=~~	~~.23000+03~~	~~Y=~~	~~.10400+05~~	~~W=~~	~~1~~
X=	.23000+03	Y=	.10283+05	W=	20
X=	.23160+03	Y=	.10493+05	W=	1
~~X=~~	~~.23250+03~~	~~Y=~~	~~.10440+05~~	~~W=~~	~~1~~
X=	.23250+03	Y=	.10440+05	W=	1

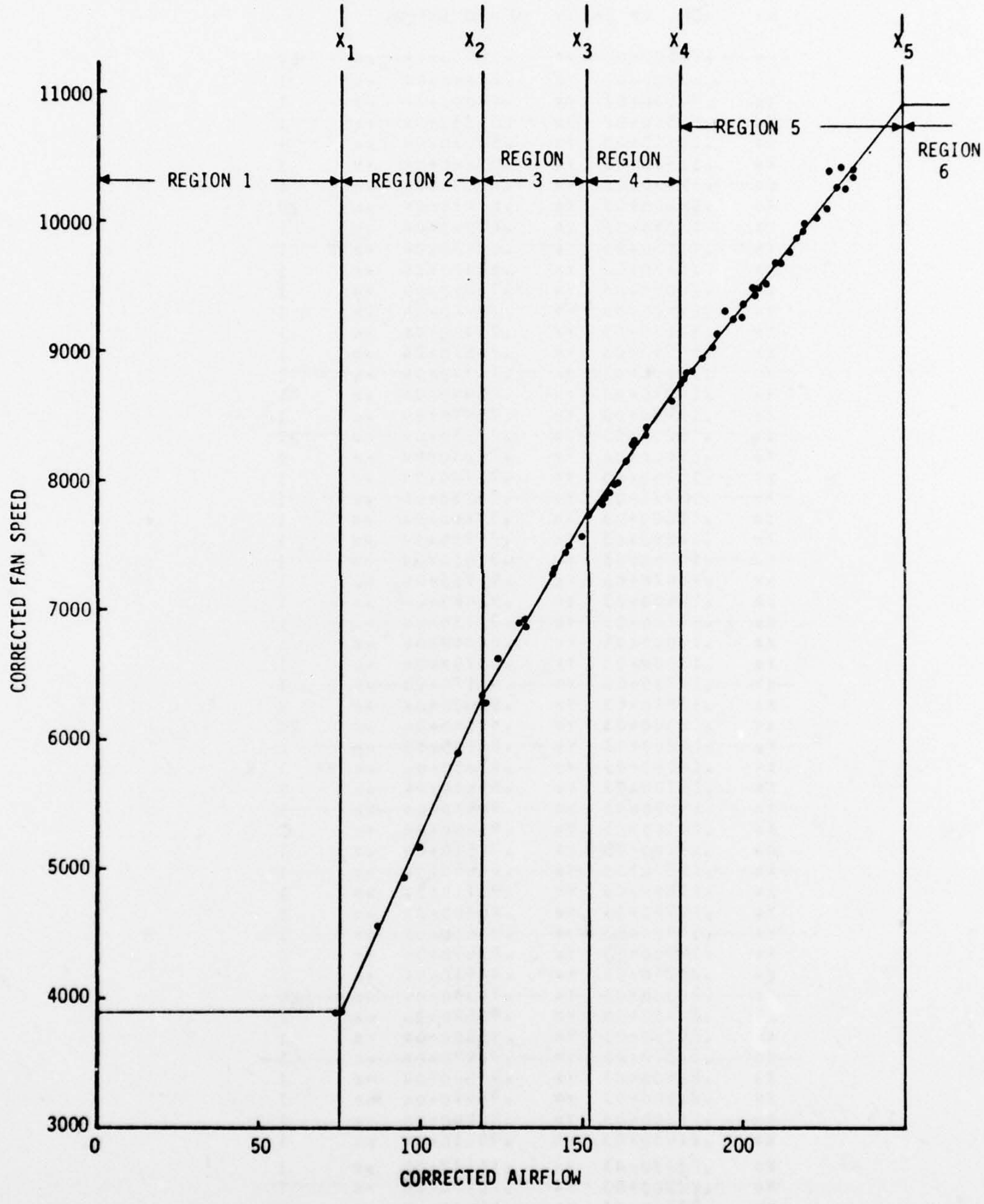


Figure J.2 Spline Schedule Generated from Data

where

$$\theta^T = [a_1, b_1, \ldots, a_5, b_5] \tag{J.3}$$

and

$$L = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ X_1 & 1 & -X_2 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & X_2 & 1 & -X_3 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & X_3 & 1 & -X_4 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & X_4 & 1 & -X_5 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \end{bmatrix} \tag{J.4}$$

where the schedule terminates in flat segments represented by

$$a_1 = a_5 = 0$$

The optimization problem is solved by adjoining the least squares problem with Lagrange multipliers for the constraints forming the algebraic problem:

$$\begin{bmatrix} A^TA & L^T \\ L & 0 \end{bmatrix} \begin{bmatrix} \theta \\ \lambda \end{bmatrix} = \begin{bmatrix} A^Ty \\ 0 \end{bmatrix} \tag{J.5}$$

The solution to (J.5) is determined by decomposition of the linear system.

The program will optimally minimize the residuals by moving the breakpoints in the table. This optimization procedure utilizes a Levenberg-Marquart nonlinear least squares algorithm which does not require explicit calculation of the

derivative of the mean residuals in each region with respect to the breakpoints. Also, additional breakpoints may be added to improve the fit. In this case, a breakpoint is inserted in the center of a region which has the largest mean residual and the optimization is repeated.

The optimal spline fits are shown in Figure J.2 for these breakpoints and the mean residuals are tabulated in each region as shown in Table J.2. The effects of optimized breakpoints and the improvement in fit using additional breakpoints were not explored in this example.

Table J.2

Results of Schedule Generation

SPLINE FITTING PROGRAM: FAN OPERATING LINE

ITERATION NUMBER= 0

	PARAMETERS
a_1	.00000
b_1	.38862+04
a_2	.56154+02
b_2	-.24679+03
a_3	.38791+02
b_3	.18194+04
a_4	.36887+02
b_4	.21089+04
a_5	.31032+02
b_5	.31628+04
a_6	.00000
b_6	.10921+05

MEAN ERROR TABLE

REGION 1	MEAN ERR=	.68408+01	NO.POINTS	20.0	BREAK	1=	.73600+02
REGION 2	MEAN ERR=	.92518+02	NO.POINTS	6.0	BREAK	2=	.11900+03
REGION 3	MEAN ERR=	.18006+02	NO.POINTS	50.0	BREAK	3=	.15200+03
REGION 4	MEAN ERR=	.23631+02	NO.POINTS	32.0	BREAK	4=	.18000+03
REGION 5	MEAN ERR=	.51724+02	NO.POINTS	67.0	BREAK	5=	.25000+03
REGION= 6	MEAN ERR=	.00000	NO.POINTS=	.0			

MEAN TOTAL ERROR= .38960+02

APPENDIX K

DESIGN OF FTIT ESTIMATOR

The FTIT estimator can be designed directly from Figure K.1 showing the transfer functions from the two inputs to the filter outputs. The design procedure will assume that the feedback, α, is small and the gains will be calculated for $\alpha = 0$. Then, α will be chosen to provide faster step response.

The first step is to determine the filter breaks, λ_1, λ_2, and λ_3. The first break, λ_1, determines the frequency

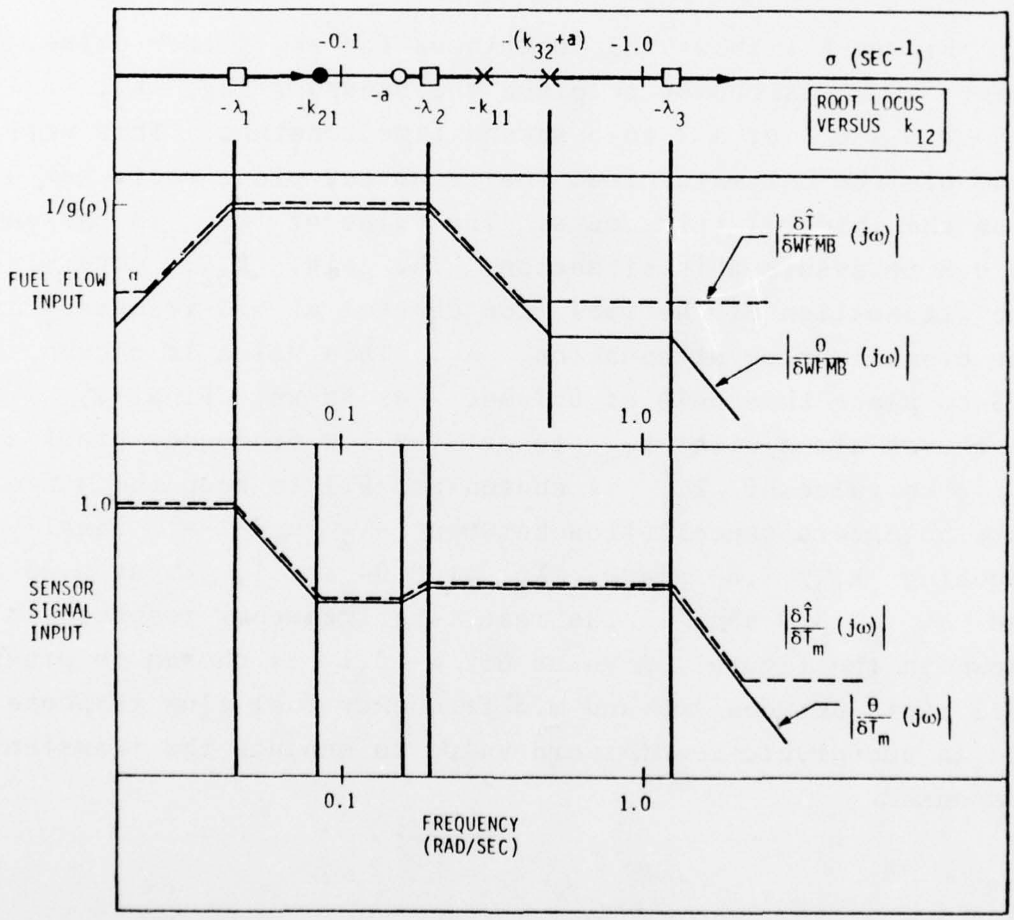


Figure K.1 Asymptotes of Frequency Response of FTIT Sensor Compensation Showing Pole-Zero Locations as a Function of Estimator Gains and Feedforward Parameter

at which fuel flow and temperature sensor inputs have the same effect. At lower frequencies than λ_1, the sensor inputs have more effect on estimator output than fuel flow. The second root, λ_2, determines the bandpass of fuel flow inputs. The largest magnitude root, λ_3, determines the noise attenuation frequency of both inputs.

The first order model for the FTIT sensor is dominated by the slow component of the response. The estimator is designed to track this input to set steady performance. The higher frequency components of the response are determined by schedule and fuel flow inputs. The sensor model parameter, a, is chosen to be 1/5 sec^{-1}.

Figure K.1 shows the root locus for the filter poles. The gain, k_{11}, is chosen to place the bandpass lag, λ_2, at 0.3 - 0.5 sec^{-1} or a 2 to 3 second time constant. This will decouple the estimator from the transient plant roots but not from the integral trim roots. The value of k_{11} is chosen to be 0.5 to assure this situation. The gain, k_{32}, determines the attenuation of the fuel flow channel at mid-frequency and the overall noise attenuation, λ_3. This value is chosen at 0.5 to place this pole at 0.7 sec^{-1} as shown. Finally, k_{21} is chosen along with k_{12} to set the low frqeuency break at λ_1. The value of k_{21} is chosen at +0.1 to keep the approximate pole/zero cancellation between $-\lambda_2$ and -a. Finally, choosing $k_{12} = 2.0$ places λ_1 at 0.04 sec^{-1}, λ_2 at 0.33 sec^{-1} and λ_3 at 3.0 sec^{-1}. The resulting frequency response is shown in the figure. A value of $\alpha = 0.1$ is chosen to provide 10:1 ratio between low and mid-frequency fuel flow response and an acceptable feedforward value to enhance the transient response.

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